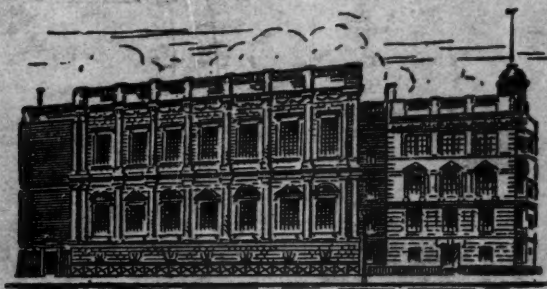


Vol. LXXVI. AUGUST, 1931

No. 503



JOURNAL



Royal United Service Institution

WHITEHALL, LONDON, S.W. 1

ALL RIGHTS
RESERVED

PUBLISHED
QUARTERLY

Price Seven Shillings and Sixpence

Sole Advertising Contractors :
Gale & Polden, Ltd., 2, Amen Corner, E.C. 4. Telephone : Central 0397.

"The first number certainly sets a high standard both in matter and make-up."—The Times, January 8th, 1930

The
**ROYAL AIR FORCE
QUARTERLY**

(Embodying also the Dominion Air Forces)
Published January, April, July, October

Edited by

Squadron Leader C. G. Burge, O.B.E.,
A.R.Ae.S.I., (Retd.)

Assisted by an Advisory Committee of
Officers and Ex-Officers of the Royal
Air Force and Dominion Air Forces

Each issue contains articles on a
wide range of subjects and of
interest and professional value
to Officers of all three Services.
Articles from Officers of the
Royal Navy and the Army will
be welcomed

Published by

GALE & POLDEN LTD.
LONDON ALDERSHOT PORTSMOUTH

Price 5/- (per post 5/6) Yearly Subscription 22/- post
free. Obtainable through any Bookseller
or Newsagent, or direct from
the Publishers.

"The R.U.S.I. Journal" is published on the 15th day of February, May, August
and November of each year.
GALE & POLDEN, LTD.,
Sole Advertisement Agents.

Of interest to Staff College Candidates

"Your Course for the Staff College Examination is exceedingly well arranged, and no trouble is spared to meet individual needs. The instruction provided was of a very high order. I consider that the full Course or any part of it provides very high value at very moderate cost, and is far superior to any other method of preparation." (From an officer who succeeded in gaining admission to the Staff College at the 1931 Examination).

UP-TO-DATE POSTAL INSTRUCTION FOR STAFF COLLEGE ENTRANCE EXAMINATION

(All obligatory and several optional subjects)

PROMOTION EXAMINATION

(all subjects) is provided by

Principal:
R. W. HOLLAND
O.B.E., M.A.,
M.Sc., LL.D.

PITMAN'S CORRESPONDENCE COLLEGE

293, SOUTHAMPTON ROW, LONDON, W.C.1

Prospectus
on
application

CONTENTS FOR AUGUST, 1931.

PAGE

SECRETARY'S NOTES	XV
FRONTISPICE: GENERAL SIR HOWARD DOUGLAS	—
GENERAL SIR HOWARD DOUGLAS.—FIRST CHAIRMAN OF THE ROYAL UNITED SERVICE INSTITUTION. BY MAJOR SIR JAMES S. DOUGLAS, BART., LATE R.G.A.	477
THE HIGHER STUDY OF WAR IN THE ARMY. BY MAJOR-GENERAL SIR CHARLES W. GWYNN, K.C.B., C.M.G., D.S.O.	479
ECONOMIC PRESSURE OR CONTINENTAL VICTORIES. (Lecture). BY CAPTAIN B. H. LIDDELL HART	486
THE SUBMARINE IN FUTURE WARFARE: A GERMAN VIEW. BY CAPTAIN G. P. THOMSON, O.B.E., R.N.	511
THE FOUNDATIONS OF THE INDIAN ARMY. BY COLONEL E. B. MAUNSELL, <i>p.s.c.</i>	520
THE DISORDERS IN BURMA. BY CAPTAIN A. G. FULLER, 20TH BURMA RIFLES	530
THE SHAKO. BY BREVET-MAJOR H. FITZM. STACKE, M.C., <i>p.s.c.</i>	534
ICEBREAKING OPERATIONS IN THE WHITE SEA, 1918-19. BY R. BARRY O'BRIEN	548
MILITARY UMPIRING. BY COLONEL C. G. S. HARVEY, D.S.O.	557
THE FUTURE OF AEROPLANE DESIGN FOR THE SERVICES. (Lecture). BY C. R. FAIREY, ESQ., M.B.E., F.R.Ae.S.	563
PLATE 1. FAIREY LONG RANGE MONOPLANE .. facing page	580
PLATE 2. THORNYCROFT DESIGN FOR A SEAPLANE CARRIER facing page	581
HIGH SPEED CRAFT FOR NAVAL USES. (Lecture). BY SIR JOHN E. THORNYCROFT, K.B.E., M.Inst.N.A.	581

Continued on page 3.

IMPERIAL ECONOMY

BY

MAJOR R. J. WILKINSON, O.B.E.

With Two Maps

Price 6s., post free 6/4. Preface by Major-General W. Kirke

SIFTON, PRAED & CO., LTD.

The Map House, 67, St. James's Street, London, S.W.1

Also from THACKER, SPINK & Co., Simla. Price Rs. 4/8



BY ROYAL WARRANTS

1838-1885



1901-1911

By Appointment

PURVEYORS OF WINE TO HIS MAJESTY THE KING

February, 1911

JOHN DOBELL & CO. LIMITED

Wine and Spirit Merchants

SHERRY

Sandeman's Full Pale
58/- per dozen
Misa's Fine Dry Pale
60/- per dozen

WHITE WINE

Podensac
27/- per dozen
Château Bouchoc St.
Croix du Mont
39/- per dozen

PORT

Dobell's Lunch Port
54/- per dozen
Cockburn's Fine Tawny
69/- per dozen

Sample Case

Containing One Bottle
of each of the above
25/-

THE average householder, whether he belongs to the Services or not, who gives his friends a small dinner or luncheon party on occasion, is generally content with Sherry, some White Wine, and a few glasses of Port to finish up with. Also he is, as a rule, not prepared to pay a high price for his Wines, and, possibly, disinclined to order more than a few bottles at a time. But because of this there is NO REASON WHATSOEVER why a good old-established firm of Wine Merchants should not be dealt with, Wine Merchants who take a pride in laying down, maturing, and preserving their wines, so that you may drink them in perfect condition. Our firm have nearly a Century's Experience of the Wine trade. In the light of that experience we recommend the wines quoted here.

Our enormous stocks of wine, some of which have lain undisturbed in our cellars for over 60 years, include White Wines from 19/-, Claret from 19/-; Ports from 42/-; Sherries from 36/-; and we have a carefully selected variety of Empire Wines from 25/- a dozen.

Full Price Lists on Application

CARRIAGE PAID BY GOODS TRAIN ON ALL ORDERS FOR SIX BOTTLES OR OVER.

246 HIGH STREET, CHELTENHAM

and at

NEWPORT, TEWKESBURY, UPTON-ON-SEVERN & GLOUCESTER

FOUNDED 1887

THE SECRETARIAL AND BUSINESS TRAINING COLLEGE

DAY, RESIDENTIAL AND POSTAL

Prospectus, giving standard of qualification for the Diploma, which guarantees
an appointment on completion of training, post free from Mr. B. J. MUNFORD,

KENSINGTON COLLEGE, Paddington, London, W. 2

CONTENTS—continued from page 1.

	PAGE
MECHANICAL MOBILITY. BY MAJOR R. A. BAGNOLD, ROYAL SIGNALS ..	595
THE INDIAN LINK IN THE CHAIN OF OUR IMPERIAL AIR ROUTES. BY WING COMMANDER W. A. McCLAUGHRY, D.S.O., M.C., D.F.C., <i>p.s.a.</i>	606
THE TERRITORIAL ADJUTANT AND HIS WORK. BY CAPTAIN G. G. R. WILLIAMS, THE LOYAL REGIMENT	609
NIGHT ATTACKS ON HARBOURS. BY COMMANDER N. C. MOORE, D.S.O., M.V.O., R.N.	616
MISSILE AND ASSAULT WEAPONS. BY LIEUTENANT-COLONEL F. S. THACKERAY, D.S.O., M.C., THE LINCOLNSHIRE REGIMENT	627
THE TRAINING OF THE ARMY OFFICER. BY CAPTAIN H. E. MADGE, 4TH P.W.O. GURKHA RIFLES	630
COAL OR OIL AS FUEL FOR THE NAVY	634
INTERNATIONAL SITUATION :—	
DISARMAMENT—	
I. SOME BRITISH VIEWS	638
II. AN AMERICAN VIEW	642
III. A GERMAN VIEW	650
IV. THE FRENCH OFFICIAL VIEW	654
SPAIN	655
TURCO-SOVIET NAVAL PACT	658
CORRESPONDENCE	659
NAVY NOTES	663
ARMY NOTES	672
AIR NOTES	678
AIRSHIP NOTES	686
REVIEWS OF BOOKS	688
ADDITIONS TO THE LIBRARY	698

Preparatory School for 35 Boys (7½ to 14)

Red House, Marston Moor, York

Headmaster (since 1922), Lieut.-Colonel E. N. MOZLEY, D.S.O., R.E. (Ret.)

SPECIAL TERMS TO OFFICERS

Six Public School Scholarships gained since March, 1925
including two "Firsts" and one "Second."

In Advanced Mathematics Five were First and One was Second.

Excellent Health Record. School Farm and Extensive Grounds.
Riding is a notable feature of school life, together with other special
outdoor interests. Many references can be given to officers whose sons
have been at Red House.

Prospectus on application.



By Appointment to the
Royal Household of Holland.

"Z.H.B." Lager

*The ideal beverage. Brewed from
finest Malt and Hops only.*

For Samples and Terms

apply to:—

ZUID HOLLANDSCHE BIERBROUWERY (LONDON) LTD.
20/21 ST. DUNSTON'S HILL, LONDON, E.C.3

Telegrams: CYPRIDES, BILGATE, LONDON.

Telephone: ROYAL 6631.

A Great Work with a Great Object.

THE SHAFTESBURY HOMES

AND 'ARETHUSA' TRAINING SHIP

(Founded 1843)

10,000 Boys have been sent to the Royal
Navy and Mercantile Marine.
Eight old "Arethusa" boys were in H.M.S.
"Vindictive" in the attack on Zeebrugge
on St. George's Day, 1918. One received
the V.C. and the others received the D.S.M.

1,100 Children are always being maintained.

FUNDS URGENTLY NEEDED

to prevent curtailment of
any Branch of the Society's
Work.

Patrons: Their Majesties
the King and Queen;
H.R.H. Princess Mary,
Countess of Harewood;
Field-Marshal H.R.H. the
Duke of Connaught, *President*;
H.R.H. the Prince
of Wales, K.G. *Chairman*
and *Treasurer*; Francis H.
Clayton, Esq. *Deputy*
Chairman; Lord Daryng-
ton. *Chairman "Arethusa"*
Committee; Howson F.
Devitt, Esq. *Secretary*;
F. Brian Pelly, A.F.C.

164 SHAFTESBURY AVENUE, LONDON, W.C.2

The Society pleads for Legacies and Bequests.

*Training Ship
'Arethusa.'*



Specialists in the Production of MILITARY HISTORIES WAR DIARIES

and all

Naval and Military Requirements

Consult

GALE & POLDEN, LTD.
2 AMEN CORNER, LONDON, E.C.4

199 CLUB

To those requiring a Club with
the atmosphere of a private house
in the best position in Kensington,
overlooking gardens, this club will
be sure to appeal.

Residential terms from £3 3s.
Bridge daily from 3 to 12. Subscription
to non-resident members £2 2s. per an.
Lessons and Practice Classes.

199, QUEEN'S GATE, S.W.7
Phone Kensington 6767. Garage accommodation

Army Promotion Examinations

[Subjects (a), (b), (c) and (d)] and

Staff College Entrance Examinations

(CAMBERLEY AND QUETTA)

AT the October, 1930, Army Promotion Examinations, Officers who prepared under the guidance of the College obtained:

3 OF 4 SPECIAL CERTIFICATES

No matter where you are stationed, the Metropolitan Services College can be of the utmost assistance to you in your preparation. Special Courses are available for Officers stationed in India and Burma.

OVER 5,900 RECENT SUCCESSES

9 SPECIAL CERTIFICATES

Write TO-DAY for a free copy of the College Prospectus
"The Army Promotion and Staff College Entrance
Examinations" Dept. M4

METROPOLITAN SERVICES COLLEGE
ST. ALBANS

SPECIMEN COPIES ON
REQUEST TO
CLUBS, MESSES, Etc.



PUBLISHED QUARTERLY:
JANUARY, APRIL,
JULY, OCTOBER.



The

FIGHTING FORCES

A QUARTERLY MAGAZINE for THE ROYAL NAVY
THE ARMY and THE ROYAL AIR FORCE

Editor: Lieut. Col. R. M. RAYNSFORD, D.S.O.

SERVICE NOTES and ARTICLES, SPORT, TRAVEL,
MOTORING, FICTION, BOOK REVIEWS.

CONTAINING 170 PAGES FULLY ILLUSTRATED IN COLOUR AND MONOCHROME.
PRICE 5/- NET. (POST FREE, 5/6.)

Obtainable from all Booksellers and Newsagents or direct from the Publishers

GALE & POLDEN, LTD., 2 AMEN CORNER, LONDON, E.C.4
WELLINGTON WORKS, ALDERSHOT NELSON HOUSE, PORTSMOUTH

HER PRIVATES WE

by "Private 19022."

is the (slightly expurgated) published version of
THE MIDDLE PARTS OF FORTUNE

(issued to subscribers only)

of which Mr. BENNETT wrote :—

"It will be remembered when *All Quiet on the Western Front*, with all its excellences, is forgotten . . . It is bound to survive as a major document in war-literature."

Fourth impression now selling.

7/6 PETER DAVIES LTD 7/6

Carlisle & Gregson

(Established over 50 Years)

5, Lexham Gardens, Kensington, W.8

STAFF COLLEGES, PROMOTION,
All SERVICE Entrance Examinations,
:: and UNIVERSITIES. ::

Telegraphic Address: "Lexjam, Kens, London."

Telephone: Western 1287.



N. A. A. F. I.

SERVES THE SERVICES

It belongs to them, is controlled by them, and aims at promoting their interests in every way.

THERE ARE NO SHAREHOLDERS

and all surplus revenue is returned to the Services in rebate, discount and other schemes for the benefit of the Services.

THE N.A.A.F.I. SUPPLIES EVERYTHING

but is strictly limited to dealing with Serving Members of the Regular Forces, their wives and families, and Territorials during Annual Training.

Headquarter Offices :

IMPERIAL COURT, UPPER KENNINGTON LANE, LONDON, S.E.11

DR. BARNARDO'S HOMES :

NATIONAL INCORPORATED ASSOCIATION.



Barnardo Boys baking bread for the World's Largest Family. 1600 loaves are baked every day, but this is only sufficient for less than half the family of 8,201 children.

Turning C.3 children into A.1 citizens

Dr. Barnardo's Homes rescue the nation's orphan and destitute children from conditions which would inevitably drag them down, and give them a new environment, train and place them out in life as useful and industrious men and women.

WILL YOU SEND A GIFT OF 10/- TO HELP BARNARDO'S CARRY ON THEIR WORK.

Cheques and Orders payable "Dr. Barnardo's Homes Food Fund" and crossed, may be sent to Dr. Barnardo's Homes, 148 Barnardo House, Stepney Causeway, London, E.1.

CHARTER :

"No Destitute Child
Ever Refused
Admission."

No red tape.

No votes required.



Once destitute, Barnardo's are
making a man of him!

BARCLAYS BANK

LIMITED.

Head Office: 54 Lombard Street, London, E.C.3
and over 2,090 Branches in England and Wales.

Chief Foreign Branch: 168 FENCHURCH STREET, LONDON, E.C.3.

FREDERICK CRAFTURD GOODENOUGH, Esq., Chairman.

SIR HERBERT HAMBLING, Bart, Deputy-Chairman.

WILLIAM FAVILL TUKE, Esq., Vice-Chairman.

General Managers;
EDWIN FISHER. HENRY THOMAS MITCHELL.

Foreign General Manager;
WALTER OSBORNE STEVENSON.

Dr. BALANCE SHEET, 31st December, 1930.				Cr.			
LIABILITIES.				ASSETS.			
	£	s.	d.		£	s.	d.
Current, Deposit and other Accounts including Reserve for Income Tax and Contingencies and balance of Profit and Loss	339,388,361	1	6	Cash in hand, and with the Bank of England... 52,509,164	8	10	
Balances in Account with Subsidiary Banks	9,884,922	4	8	Balances with other British Banks and Cheques in course of collection	10,600,253	15	1
Acceptances and Endorsements, &c., for account of Customers	12,710,524	1	4	Money at Call and Short Notices	23,316,100	0	0
Capital:—				Bills Discounted	50,901,976	18	5
Authorized—				Investments (including £609,051 4s. 6d. lodged as security for Public Authority and other Accounts):			
1,425,000 "A" Shares of £4 each	5,700,000	0	0	Securities of, or guaranteed by, the British Government	53,893,050	14	5
14,300,000 "B" and "C" Shares of £1 each	14,300,000	0	0	British Dominions and Colonial Government Securities, Bank of England and British Corporation Stocks	1,724,765	11	4
	£20,000,000	0	0	Other Investments	469,830	1	1
Issued—					56,087,646	6	10
857,589 "A" Shares of £4 each, fully paid	3,430,356	0	0	Investments in Subsidiary Banks:— (at cost, less amounts written off)			
11,760,811 "B" Shares of £1 each, fully paid	11,760,811	0	0	The British Linen Bank—	£1,237,909	Stock	3,713,727 0 0
667,050 "C" Shares of £1 each, fully paid	667,050	0	0	Union Bank of Manchester Limited—	300,000	Shares of £5 each, £2 10s. paid	1,050,000 0 0
Reserve Fund				Other Subsidiary Banks— (including fully paid Shares and 500,000 "B" Shares of £5 each, £1 per Share paid up, in Barclays Bank (Dominion, Colonial and Overseas))			2,210,237 18 7
				Advances.—			
				Customers and other Accounts	168,479,886	13	9
				Staff for purchase of Barclays Bank Limited "C" Shares	52,014	12	5
				Balances in account with Subsidiary Banks	1,140,396	11	3
				Liability of Customers for Acceptances and Endorsements, &c.			169,672,247 17 5
				Bank Premises and Adjoining Properties (at cost, less amounts written off)			12,710,524 1 4
							6,320,146 3 0
							£388,092,024 7 6

F. C. GOODENOUGH, Chairman.
HERBERT HAMBLING, Deputy-Chairman.
W. FAVILL TUKE, Vice-Chairman.
E. FISHER,
H. T. MITCHELL } General Managers.

J. H. BECKWITH. } Joint
C. D. CARRUTHERS } Chief Accountants.
W. N. SEERLEY, Secretary.

AUDITORS' REPORT TO THE MEMBERS OF BARCLAYS BANK LIMITED

We have compared the above Balance Sheet with the balances on the Books at the Head Office, and with the detailed Returns from the Branches. We have verified the Cash with the Bank of England, the Cash and Bills at the Head Office, the Investments of the Bank and the Securities held against Money at Call and Short Notice. We have obtained all the information and explanations we have required, and we are of the opinion that the above Balance Sheet is properly drawn up so as to exhibit a true and correct view of the state of the Bank's affairs according to the best of our information and the explanations given to us and as shown by the Books and Returns of the Bank.

London, 24 January, 1931.

PRICE, WATERHOUSE & CO.,
KEMP, CHATTERIS, NICHOLS, SENDALL & CO., } Auditors.

Sir!

Doubtless you have interests in some Company or other dividend-earning concerns that rely to a great extent on well-conceived publicity for the creation of "sales."

Have you ever considered the wide and wonderful circulation that every copy of "The Journal of the Royal United Service Institution" gets?

You are in a position to appreciate, better than anybody, the tremendous pull of a Magazine of such standing. Here, therefore, is a medium of proved value. Its advertisement pages command attention again and again.

Why not try it for the business you are interested in?

Rates, specimens and positions available from

ADVERTISEMENTS MANAGER,
"THE JOURNAL OF THE ROYAL
UNITED SERVICE INSTITUTION"
(Central 0397)

2, AMEN CORNER, LONDON, E.C. 4

Royal Soldiers Daughters' Home.



(Founded 1855).
Incorporated
1923

For the
Maintenance,
Clothing, and
Education of
Daughters of
Soldiers,
whether
Orphans
or not.

The children are
trained for Do-
mestic Service
and in special
cases for Trades.

Patrons: Their Majesties **The King and Queen.**
Vice-President & Chairman: Field-Marshal Viscount
Plumer, G.C.B., G.C.M.G., G.C.V.O., G.B.E.

Admission, between the ages of six and eleven
years, by approval of the Committee. Age of de-
parture, seventeen, when a situation is guaranteed
to them and they are supplied with an outfit.

GENEROUS GIFTS. Annual Subscriptions and
Donations urgently invited and thankfully received
by the Secretary, Major H. S. Marshall, D.S.O.,
at the Home, 65, Rosslyn Hill, Hampstead, N.W.3,
or the Hon. Treasurer, Lloyds Bank, Ltd. (Cox's &
King's Branch), 6, Pall Mall, S.W.1.

ALPINE SPORTS, LTD.

5 Endsleigh Gardens, London, W.C.1
Piccadilly Office, 2 Albany Courtyard

THE PIONEERS OF WINTER SPORTS TRAVEL

"Better than hunting, at a tenth of the cost."

PUBLIC SCHOOLS WINTER SPORTS CLUB HOTELS at

BERGÜN	MÜRREN
MALOJA	PONTRESINA
MORGINS	SILS
WENGEN	

Arrangements also at Adelboden, Ander-
matt, Arosa, Davos, Engelberg, Griesalp,
Grindelwald, Kitzbühel, Klosters, Lenzer-
heide, St. Anton, Savognin, Scheidegg,
Villars, Zermatt, etc.

Illustrated booklet, plans and particulars
on request. Rates to suit all pockets.

Spend your leave in Switzerland

PALL MALL DEPOSIT

AND FORWARDING CO. LTD.

Carlton Street, Lower Regent Street

(FIFTY YARDS FROM PICCADILLY CIRCUS, S.W. 1)

Telephone: GERRARD 4546

Cables: BURNISHED, LONDON

BAGGAGE STORED

*In the centre of West End, near all
the Service Clubs and principal Hotels*

Access to baggage available during office
hours without notice. Accommodation for
unpacking and repacking kit free of charge.

REDUCED RATES FOR MEMBERS OF H.M. SERVICES

PLAYER'S

NAVY MIXTURE or
NAVY CUT TOBACCO



No man lights his pipe with
greater expectancy or smokes it
with greater satisfaction than the
one who regularly fills it with
PLAYER'S

110¹/₂
PER OUNCE

N.C.T.3C.

JOURNAL
of the
Royal United Service
Institution

Published by Authority of the Council.



Postal Address: Whitehall, London, S.W.1

Telephone No. Victoria 0654.

Telegraphic Address: "Russatus, Parl, London."

Vol. LXXVI. AUGUST, 1931. No. 503.

Sole Advertising Contractors:

Gale & Polden, Ltd., 2, Amen Corner, E.C.4. Telephone: Central 0397.

ROYAL UNITED SERVICE INSTITUTION

FOR

"THE PROMOTION AND ADVANCEMENT OF NAVAL AND MILITARY SCIENCE
AND LITERATURE."
Royal Charter, 22nd February, 1860 (23 Vict.).

PATRON :

H.M. KING GEORGE V.

VICE-PATRON

H.R.H. The PRINCE OF WALES, K.G., K.T., K.P., G.C.S.I., G.C.M.G.,
G.C.I.E., G.C.V.O., G.B.E., M.C.

PRESIDENT :

Field-Marshal H.R.H. The DUKE OF CONNAUGHT, K.G., K.T., K.P., G.C.B.,
G.C.S.I., G.C.M.G., G.C.I.E., G.C.V.O., G.B.E., V.D.

VICE-PRESIDENTS :

Field-Marshal The Viscount ALLENBY, G.C.B., G.C.M.G., D.C.L., LL.D.

General The Viscount BYNG, G.C.B., G.C.M.G., M.V.O., LL.D.

Admiral of the Fleet The Earl JELLICOE, G.C.B., O.M., G.C.V.O., LL.D.

Lieut.-Colonel Sir ARTHUR LEETHAM, Kt., K.C.V.O., C.M.G., F.S.A.

Field-Marshal Sir W. R. ROBERTSON, Bart., G.C.B., G.C.M.G., G.C.V.O.,
D.S.O., D.C.L., LL.D.

Marshal of the Royal Air Force Lord TRENCHARD, G.C.B., D.S.O., D.C.L., LL.D.

Admiral Sir R. G. O. TUPPER, G.B.E., K.C.B., C.V.O.

ELECTED MEMBERS OF COUNCIL :

Royal Navy.

Admiral Sir GEORGE P. W. HOPE, K.C.B., K.C.M.G.

Admiral of the Fleet Sir ROGER J. B. KEYES, Bt., G.C.B., K.C.V.O., C.M.G.,
D.S.O., LL.D., D.C.L., (*Vice-Chairman of the Council*).

Rear-Admiral The Hon. R. A. R. PLUNKETT-ERLE-DRAX, C.B., D.S.O.
(One vacancy).

Royal Marines.

Lieut-General A. G. LITTLE, C.M.G., R.M., A.D.C.

Royal Naval Reserve.

Captain Sir D. WILSON-BARKER, Kt., R.D., R.N.R.

Royal Naval Volunteer Reserve.

Captain The Earl HOWE, C.B.E., V.D., R.N.V.R.

Regular Army.

General Sir J. F. NOEL BIRCH, G.B.E., K.C.B., K.C.M.G.

Major-General Sir JOHN E. CAPPER, K.C.B., K.C.V.O.

Colonel C. H. COLVIN, C.B., D.S.O.

Major-General B. D. FISHER, C.B., C.M.G., D.S.O., A.D.C.

Lieut-General J. R. E. CHARLES, C.B., C.M.G., D.S.O.

General Sir A. A. MONTGOMERY-MASSINGBERD, K.C.B., K.C.M.G.

Lieut.-Colonel A. F. A. N. THORNE, C.M.G., D.S.O.

Militia.

Colonel *Lord* AMPHILL, G.C.S.I., G.C.I.E.

Territorial Army.

Colonel A. S. BATES, D.S.O., T.D.

Colonel J. JOSSELYN, C.M.G., D.S.O., O.B.E., T.D.

Brig.-General *The Earl of* LUCAN, K.B.E., C.B., T.D.

Colonel B. ABEL SMITH, D.S.O., M.C., T.D., A.D.C.

Indian Army.

Field-Marshal *Sir* CLAUD W. JACOB, G.C.B., G.C.S.I., K.C.M.G. (*Chairman of the Council*).

Royal Air Force.

Air Vice-Marshal *Sir* VYELL VYVYAN, K.C.B., D.S.O.

REPRESENTATIVE MEMBERS.

ADMIRALTY.

Director of Naval Intelligence : Rear-Admiral C. V. USBORNE, C.B., C.M.G.

WAR OFFICE.

Director of Staff Duties : Major-General *Sir* IVO L. B. VESEY, K.B.E., C.B., C.M.G., D.S.O.

AIR MINISTRY.

Air Officer Commanding-in-Chief, Air Defence of Great Britain : Air Marshal *Sir* E. L. ELLINGTON, K.C.B., C.M.G., C.B.E.

EX-OFFICIO MEMBERS.

First Sea Lord : Admiral *Sir* FREDERICK L. FIELD, G.C.B., K.C.M.G.

Chief of the Imperial General Staff : Field-Marshal *Sir* GEORGE F. MILNE, G.C.B., G.C.M.G., D.S.O.

Chief of the Air Staff : Air Chief-Marshal *Sir* JOHN M. SALMOND, G.C.B., C.M.G., C.V.O., D.S.O., A.D.C.

Director-General of the Territorial Army : General *Sir* REGINALD B. STEPHENS, K.C.B., C.M.G.

President of the Royal Naval College, Greenwich : Vice-Admiral *Sir* W. H. D. BOYLE, K.C.B.

Commandant of the Imperial Defence College : Air Marshal *Sir* ROBERT BROOKE-POPHAM, K.C.B., C.M.G., D.S.O., A.F.C.

Director of the Royal Naval Staff College : Captain T. F. P. CALVERT, D.S.O., R.N.

Commandant of the Staff College, Camberley : Major-General J. G. DILL, C.B., C.M.G., D.S.O.

Commandant of the R.A.F. Staff College, Andover : Air Commodore P. B. JOUBERT DE LA FERTÉ, C.M.G., D.S.O.

HONORARY MEMBERS OF THE COUNCIL.

General *Sir* A. W. CURRIE, G.C.M.G., K.C.B. (Canada).

Lieut.-General *Sir* J. MONASH, G.C.M.G., K.C.B., V.D. (Australia).

Major-General *Sir* A. H. RUSSELL, K.C.B., K.C.M.G. (New Zealand).

General *The Right Hon.* J. C. SMUTS, P.C., C.H. (South Africa).

Lieut.-General H.H. THE MAHARAJAH OF BIKANER, G.C.S.I., G.C.I.E., G.C.V.O., G.B.E., K.C.B. (India).

STAFF.

Secretary, Editor and Chief Executive Officer : Captain E. ALTHAM, C.B., R.N.

Librarian and Curator : Colonel E. L. HUGHES, D.S.O., O.B.E.

Assistant Editor : Lieut.-Colonel H. G. de WATTEVILLE, C.B.E., late R.A.

Assistant Executive Officer : Captain S. J. PARKER, M.C., D.C.M.

Auditors : MESSRS. BARTON, MAYHEW & Co.

Alderman's House, Bishopsgate, E.C.2.

Bankers : ROYAL BANK OF SCOTLAND, DRUMMOND'S BRANCH,
Charing Cross, S.W.1.

MEMBERSHIP

Full particulars of Membership with alternative forms for Bankers' Orders can be obtained on application to "The Secretary, Royal United Service Institution, Whitehall, London, S.W.1."

Commissioned Officers of *all* H.M. fighting Services, including those of the Dominions, Colonies and India, and Midshipmen of the Royal Navy, Royal Naval Reserve and Royal Naval Volunteer Reserve, are eligible for membership without proposal or ballot.

Naval, Military and Air Force Cadets are eligible on the recommendation of their Commanding Officers.

An Officers' Mess may subscribe to the JOURNAL, but is *not* eligible for membership.

TERMS OF SUBSCRIPTION.

ANNUAL MEMBERS.—Entrance £2 2s. od.; annual subscription, payable on 1st January each year, £1 5s. od.

Annual Members joining on and after 1st October are not called upon for any subscription for the following year.

LIFE MEMBERS.

(a) £20 os. od., payable in one sum or :

(b) £21 os. od., payable in four instalments of Five Guineas, the first on joining, the others on 1st January of each succeeding year.

The above rates of subscription entitle Members to the loan of four volumes at a time from the Library, provided they are at Home or at those stations abroad where arrangements exist for forwarding books.

It is important that Officers joining should furnish full and clear particulars of their Name, Rank, Ship, Regiment or R.A.F. Squadron, etc., and the address to which they wish their JOURNALS sent.

Officers of the Indian, Dominion and Colonial Naval, Military and Air Forces temporarily in the United Kingdom may become members for a period of six months on payment of Ten Shillings and Sixpence, or One Guinea for twelve months.

SPECIAL FACILITIES FOR JUNIOR OFFICERS.—Officers of less than three years seniority in commissioned rank, Midshipmen R.N., R.N.R., R.N.V.R., and Naval, Military and Air Force Cadets are not required to pay the Entrance Fee, but their membership will date from 1st January.

THE INSTITUTION.

The Royal United Service Institution is situated just below the War Office in Whitehall. It has the best professional Library in the United Kingdom; a Lecture Theatre where an autumn and winter session of lectures is devoted to subjects of current or historical Service interest. The Reading and Smoking Rooms are provided with the leading papers, periodicals and writing materials.

The Institution is open daily from 10 a.m. to 7 p.m., except Sunday, Christmas Day and Good Friday.

THE JOURNAL.

The R.U.S.I. JOURNAL is published quarterly and sent post free to Members in any part of the world.

THE MUSEUM.

Situated in the Banqueting Hall of the old Palace of Whitehall (1622), with its magnificent Rubens ceiling, the R.U.S.I. Museum is a treasure house of relics and mementoes of great victories and renowned warriors. There is also a most valuable collection of Uniforms, Medals, Ship Models, and models of the battles of Trafalgar and Waterloo.

For Members and their friends, there are private entrances to the Museum from the Institution.

H.M. Forces in uniform are admitted free at the public entrance.

Admission to the general public is 1s.; Saturday after Noon, 6d.

SECRETARY'S NOTES

August, 1931

THE CENTENARY OF THE FOUNDATION OF THE ROYAL UNITED SERVICE INSTITUTION

Evening Reception

An Evening Reception was held on the 2nd July to celebrate the Centenary of the Foundation of the Institution. It was attended by H.R.H. The Duke of Connaught (President); Field Marshal Viscount Allenby, Marshal of the Royal Air Force Lord Trenchard, and Admiral Sir Reginald G. O. Tupper (Vice-Presidents); Field Marshal Sir Claud W. Jacob (Chairman of the Council), and Admiral of the Fleet Sir Roger J. B. Keyes (Vice-Chairman of the Council); and about six hundred members and friends.

The Banqueting Hall, where the guests were received, was brilliantly illuminated, the effect being greatly enhanced by the newly installed flood-lighting of the Rubens Ceiling.

By courtesy of Colonel J. E. Gibbs, Commanding the Coldstream Guards, music was provided throughout the evening by the string band of that Regiment, under Director of Music, Lieutenant J. C. Windram.

The Centenary Exhibition in the Crypt proved a great attraction, and the library and reading room were utilised for a buffet, where the tables were decorated with some of the fine silver plate from the Museum.

Messages of Congratulation

Messages of congratulation on the attainment by the Institution of its Centenary were received from the United Service Institutions of New South Wales and Victoria, Australia, and from the United States Naval Institute. Suitable expressions of thanks were returned in each case.

Centenary Fund

This Fund is being kept open until the end of the current year with a view to securing some object or objects of lasting benefit to the Institution or Museum. It has been decided that the first purpose of the Fund shall be the acquisition of a portrait of His Majesty the King. Donations, however small, will be most welcome. Cheques should be made payable to the Royal United Service Institution and crossed "A/c of Centenary Fund." The Committee beg to acknowledge receipt of donations to the Fund from the following members since the publication of the May JOURNAL: Major J. D. Ogilvy, Colonel Sir F. L. Nathan, Colonel H. C. Wyllie, Admiral Sir D. M. Anderson, Lieutenant-Colonel H. G. Riley, Lieutenant-Colonel H. L. Cottingham, Squadron Leader W. G. Weston, Lieutenant-Colonel C. F. Call, Captain F. K. C. Gibbons, R.N., Admiral Sir George P. W. Hope, Lieutenant-Colonel Sir W. Spender, Admiral Sir R. G. O. Tupper, Surgeon Captain Robley Browne, R.N., Lieutenant-Colonel S. G. R. Willis, Major-General S. S. Long, Captain G. Ilderston, Lieutenant-Commander H. H. MacLean, R.N., Major C. W. Peters, Captain H. T. A. Bosanquet, R.N., Captain F. A. Woods, Lieutenant-Colonel W. O. Cavanagh, Commander R. H. Bevan, R.N., Paymaster Lieutenant F. J. Carey, R.N.R., Commander L. G. Garbett, R.N., Colonel A. H. D. Creagh, Colonel J. F. Manifold, Field Marshal Sir Claud W. Jacob, Major H. Lloyd, Howard, Brigadier R. Gardiner, Lieutenant Commander W. S. Galpin, R.N., Captain J. A. Collins, Air Vice-Marshal Sir Vyell Vyvyan, Admiral Sir William Henderson, Vice-Admiral Sir W. H. D. Boyle, Midshipman D. K. Buchanan-Dunlop, Colonel J. A. M. A. Clark, Lieutenant D. L. Cowan, R.N., Major G. A. H. Samuel, Captain J. Bell White, R.N.R.

Centenary Booklet

The first part of the May JOURNAL, containing chapters dealing with the Foundation of the Institution, the history of the Banqueting Hall, the development of the Royal Navy, the British Army and of Service aviation during the past hundred years, together with a large number of appropriate illustrations, has been republished in booklet form as a souvenir of the Centenary. Copies can be supplied for 1s. or 1s. 3d. post free.

Vice-President

Field Marshal Sir W. R. Robertson, Bart., G.C.B., G.C.M.G., K.C.V.O., D.S.O., D.C.L., LL.D., has been re-elected a Vice-President of the Institution.

Council

Major-General Sir Ivo L. B. Vesey, K.B.E., C.B., C.M.G., D.S.O., has succeeded Major-General C. Bonham-Carter, C.B., C.M.G., D.S.O., as War Office Representative, and Air Marshal Sir Edward L. Ellington, K.C.B., C.M.G., C.B.E. has succeeded Air Vice-Marshal F. W. Bowhill, C.M.G., D.S.O., as Air Ministry Representative on the Council.

New Members

The following Officers joined the Institution during the months May, June and July :

ROYAL NAVY

Commander D. Young-Jamieson, R.N.
Lieutenant R. E. Portlock, R.N.
Midshipman H. R. A. Kidston, R.N.
L. F. E. MacMahon (late Sub-Lieutenant, R.N.R.).
Captain R. V. S. Johnstone, R.M.
Captain R. B. Davies, V.C., D.S.O., A.F.C., R.N.

ARMY

Lieutenant J. E. Hill, 1st K.G.O. Gurkha Rifles.
Captain B. Lubbock, R.F.A. (T.).
Lieutenant-Colonel A. D. Greenhill Gardyne, The Gordon Highlanders (retired).
Captain C. W. M. Rogers, 12th London Regiment (Rangers).
2nd Lieutenant A. G. Disney-Roebeck, R.A.
Lieutenant K. E. M. Brunker, The Cameronians.
Colonel C. J. Troyte-Bullock, D.S.O., Somerset Light Infantry (retired).
Captain G. M. O. Davy, 3rd The King's Own Hussars.
Lieutenant H. P. Drayson, R.E.
Lieutenant G. H. W. Bond, 1st K.G.O., Gurkha Rifles.
Captain P. B. Webb, 10th London Regiment (T.A.).
Captain F. G. Rogers, South Staffordshire Regiment.
2nd Lieutenant R. L. Henson, K.O.S.B.
Lieutenant R. P. O. Poole, Royal Warwickshire Regiment.
Captain J. W. Kenny, R.A.
Lieutenant R. G. G. Harvey, The Leicestershire Regiment.
Lieutenant C. F. F. Clifton, The Royal Fusiliers.
Captain L. B. Robertson, Argyll and Sutherland Highlanders.
Captain R. C. O. Hedley, 5th Royal Gurkha Rifles.
Lieutenant V. D. L. Talbot, Hampshire Regiment.
2nd Lieutenant G. H. S. Du Pontet, 12th London Regiment (Rangers).
Lieutenant Yadunath Singh, 19th Hyderabad Regiment.
2nd Lieutenant R. B. Hale, The Royal Sussex Regiment.
Lieutenant H. W. Bambridge, R.A.M.C. (T.A.).
Gentleman Cadet Gurdip Singh.
Lieutenant W. H. F. Routh, Somerset Light Infantry.
Brigadier E. B. Mathew-Lannowe, C.M.G., D.S.O.
2nd Lieutenant A. G. Puttock, 10th London Regiment (T.A.).
2nd Lieutenant R. A. Pilkington, Coldstream Guards.
Captain The Lord Stratheden, Coldstream Guards.
2nd Lieutenant J. V. Bailey, Royal Scots Fusiliers.

ROYAL AIR FORCE.

Flying Officer S. W. Coleman, Royal Canadian Air Force.

CIVILIAN MEMBER.

(Elected under Bye-Law 2 (a) Chapter II).

F. E. McMurtrie, Esq.

Members Joining in October

The attention of potential Members is invited to the fact that if they join on or after 1st October of the current year, they are not called upon for any further subscription until January, 1933.

Special Facilities for Junior Officers

The attention of Members is invited to the Bye-Law governing the entrance of Junior Officers to the Institution. The terms are as follows :—

"Commissioned Officers of the Home, Dominion, Indian and Colonial fighting Services and their Reserves, of three years or less seniority as such ; Midshipmen, R.N., R.N.R. and R.N.V.R. ; and Naval, Military and Air Force Cadets, shall be admitted to Membership without Entrance Fee on payment of the first annual subscription of £1 5s.

"In all cases eligibility for such Membership shall be governed by para. 1 of Chapter 2.

"An Officer who is admitted without entrance fee and who subsequently fails to pay his annual subscription regularly or resigns, shall not be re-admitted without payment of such fee, notwithstanding the fact that he may, by virtue of his rank or seniority, be otherwise eligible for such concession.

"Officers joining under this Bye-Law will date their Membership from 1st January of the year in which they join. They shall not have the privilege of becoming Members in October and of paying no subscription on the ensuing 1st January."

Civilian Members

Attention is invited to the new Bye-Law passed at the last Annual General Meeting, which reads as follows :—

"A limited number of eminent individuals, not otherwise eligible, who have contributed towards the promotion and advancement of naval and military science and literature may be elected members by ballot of the Council. The limit of the number of such Members shall be fixed from time to time by the Council.

"Candidates for ballot and for admission must be duly proposed and seconded by Members personally acquainted with them."

Gold Medal Essay, 1931

Competitors are reminded that essays for the 1931 Gold Medal Competition must reach the Secretary by the 15th November.

Programme of Lectures

The Programme of Lectures for the 1931-32 Session is well advanced, and copies will be sent to Members in due course.

JOURNAL

Copies of Frontispieces

A limited number of copies of the coloured frontispieces, published in recent numbers of the JOURNAL, are available for sale, and can be supplied post free for 1/6 each.

Photographs of the Banqueting Hall

Reproductions of the fine double-page photograph of the Banqueting Hall, published in the JOURNAL for August, 1930, can be supplied, unfolded, for 6d. post free.

Price of Journal to Non-Members

The price of the JOURNAL to Non-Members, as from February, 1927 number, is 7s. 6d., or the four quarterly numbers will be sent for an annual subscription of £1 10s. ; post free in either case.

Trade Discount

Recognised firms can now be supplied with not less than one dozen copies of the JOURNAL at a time, at a wholesale price of 7s. each copy, the buyer to collect from the Institution.

Additional Copies of the Journal

Additional copies of early numbers of the JOURNAL, if available, can be supplied, post free, to Members at :—

3s. for JOURNALS prior to February, 1927.

4s. for the JOURNAL of February, 1927, and later.

LIBRARY

Facilities for Borrowing Books

The special attention of Members who are now paying the new annual subscription of £1 5s. od., is invited to the fact that they are thereby entitled to the full privileges of the Lending Library without further charge. These include the right to have sent to them not more than four volumes at a time on loan, the Member paying postage both ways.

Old Members who have not wished to conform to the new arrangement and who are still paying the original subscription of £1 1s. od., must pay an additional subscription of 10s. per annum in order to belong to the Lending Library.

All Members are, of course, free to use the Library when they visit the Institution.

MUSEUM

Centenary Exhibition

The greater part of the Crypt has been rearranged, and is now devoted to a Centenary Exhibition. This includes :—

NAVAL : Models and pictures representing progress in warship construction in the past hundred years.

ARMY : Dioramas representing the most famous battles during the past hundred years, and the Army of to-day. Scale models of guns, tanks, armoured cars and a modern military bridge. Exhibits depicting a hundred years of head-dresses, small arms and projectiles.

AIR : Panoramas of aircraft models and a series of coloured photographs, showing the development of Service aviation from earliest days, with special sections devoted to :—The Royal Naval Air Service and Fleet Air Arm ; The Royal Flying Corps and Army Co-operation Squadrons ; Coastal Reconnaissance Squadrons, and other Royal Air Force types of to-day.

Additions

- (8384-5) Collection of Engravings.—Presented by W. S. Smyth, Esq.
- (8386) Sword of Napoleon I, with silver sheath, and sword of Dr. P. O'Callaghan. Bequeathed by Major-General Sir D. D. T. O'Callaghan.
- (8387) Naval tomahawk, period about 1830.—Presented by the Rev. H. R. Huband.
- (8388) Ticket of admission to the R.U.S. Museum, signed by Captain F. Marryat R.N. ; period about 1839.—Presented by Commander A. T. Stewart.
- (8389) German parabellum pistol, picked up near Damascus during the advance in October, 1918.—Presented by Colonel W. B. Sudds.
- (8390) .303 Vickers machine-gun and .303 Lewis machine-gun.—Purchased.
- (8391) Two brass cannons captured at Tel-el-Kebir.—Presented by His Majesty the King.
- (8392) Soldier's handkerchief depicting items of military training about 1880.—Presented by D. Gunn, Esq.
- (8393) Models of French field guns, limbers and mortars, and of mounted and unmounted French artillery personnel.—Presented by Lieut.-Colonel R. A. Ray.
- (8394) Tin of food taken by Captain Parry on his Arctic expedition, 1825.—Presented by F. Foreshaw, Esq.
- (8396) Model of Cierva's Autogiro.—Presented by Colonel J. Josselyn.
- (8397) Collection of dummy shells in use in the Army in 1931.—Presented by the Army Council.
- (8398) Photograph of a rare engraving of Field-Marshal the Duke of Wellington, from a sketch by Lieutenant Downman, R.A., made at Badajoz.—Presented by Lieut.-General Sir G. F. Ellison.

- (8399) Composite photograph of the officers who fought at Tel-el-Kebir.—Presented by Major F. Swaine.
 (8400) Medals of Major H. Harvey, The Rifle Brigade.—Presented by Miss Wood.
 (8401) Belt-plate of the Royal Fusiliers prior to 1855.—Presented by Her Majesty the Queen.

Loan

- (3588) Twenty military dioramas.—Lent by the Department of Overseas Trade.

Ship Model Postcards

A series of photographic post-cards of selected models illustrating types of ships of the Royal Navy in the days of sail and in the present fleet are now on sale at 1s. per packet of eight—post free.

Attendance

The amount taken for admission during the last Quarter was:—

£142 2s. 6d. in May.
 £125 2s. 0d. in June.
 £171 12s. 6d. in July.

Purchase Fund

This Fund has been opened to assist in the purchase of new exhibits. The Council hope that it will receive the support of Members interested in the Museum.

								£	s.	d.
Balance in hand	..	..	..	..	..	..	..	38	13	3
" C.A.B.P." ..	..	..	..	..	..	..	..	1	1	0
								<hr/>		
								£39	14	3
								<hr/>		
Purchased										
Models of tanks	..	..	..	..	..	..	..	8	2	0
								<hr/>		
								£31	12	3
								<hr/>		



From a Miniature.

By courtesy of Mrs. Berkley Portman.

**GENERAL SIR HOWARD DOUGLAS,
FIRST CHAIRMAN OF THE
ROYAL UNITED SERVICE INSTITUTION**

474

GENERAL SIR HOWARD DOUGLAS

THE JOURNAL

OF THE

Royal United Service Institution

Vol. LXXVI.

AUGUST, 1931.

No. 503.

[Authors alone are responsible for the contents of their respective Papers.
All communications (except those for perusal by the Editor only)
should be addressed to the Secretary, Royal United Service Institution.]

GENERAL SIR HOWARD DOUGLAS.

FIRST CHAIRMAN OF THE ROYAL UNITED SERVICE INSTITUTION

By MAJOR SIR JAMES S. DOUGLAS, Bart., late R.G.A.

(Sir Howard Douglas, then a Major-General, presided at the meeting when the Institution was actually formed, and subsequently became first Chairman of the working Committee, afterwards known as the Council. His many accomplishments, wide experience and intimate knowledge of both Services were of inestimable value in the early days of the Institution's development.

The following short biography is contributed by his grandson.—

EDITOR.)

GENERAL SIR HOWARD DOUGLAS, Bart., G.C.B., G.C.M.G., F.R.S., D.C.L., was born in 1776 and died in 1861. He was the son of Vice-Admiral Sir Charles Douglas, who had been Captain of Rodney's flagship at the battle of Dominica. Sir Howard was devoted to the sea, but on the sudden death of his father in 1790 he was given a nomination for the Royal Academy at Woolwich. He failed to pass the entrance examination in mathematics; but—and it was characteristic of his whole life's work—although he was only fourteen, he refused to go home, got himself a lodging in Woolwich and found a teacher by whose aid he was able to pass the examination after a few weeks study.

During his Subaltern's service we find him commanding the artillery on the Tyne. Here he raised a corps several hundred strong from the shipyards, and trained them as gunners to supplement a command which was inadequate to meet invasion, which seemed to threaten the

coast in those days. In 1795 he embarked for Quebec in the transport "Phyllis" in command of a detachment. The ship was wrecked at the entrance to the Gulf of St. Lawrence, and in the subsequent adventures of the survivors Douglas greatly distinguished himself.

In 1799 he became a Captain in the Royal Artillery, but in 1804 was transferred to the Infantry and given the rank of Major in the line to enable him to be appointed Commandant of the Senior Department of the Military College, which had just been founded. In this post he was responsible for greatly improving and extending the system of instruction.

The numbers at the Military College were reduced, and, in 1808, Douglas—now a brevet Lieutenant-Colonel—sought active employment in Spain, where he filled several important positions. He remained in Spain until 1812 when he was recalled to the Military College at the special request of the Commissioners. He became a brevet Colonel in 1814, and was promoted to Major-General in 1821.

In 1820 he published his "Treatise on Naval Gunnery." This was well received by the Navy, and eventually led to the establishment of the first naval gunnery school, H.M.S. "Excellent."

In 1823 he was appointed Governor of New Brunswick. Here he shouldered tasks which left their mark in the development and organization of a great part of Canada, and did much to advance all departments of life in his own Province.

He became High Commissioner of the Ionian Islands in 1835, which difficult appointment he filled with pronounced success and to the benefit of the islands. He was promoted to Lieutenant-General in 1837, and to General in 1851.

In 1842 he entered Parliament, and remained a Member until the dissolution in 1846, after which he devoted the remainder of his life to dealing with professional matters, his opinions being widely sought. His publications were numerous and important and covered a diversity of subjects. They bear witness to the scope and depth of his scientific attainments, and it was said of him that the value of his labours lay in his peculiar capacity for grafting new discovery on to old experience.

In this short account of Sir Howard's life it is not possible to do more than give a bare outline of his achievements and of his propensity for helping others. He accomplished much that was of lasting value to our fighting Services, and gained the approval and confidence of all in the many and diverse places and circumstances in which it fell to his lot to direct affairs.

Note.—A full account of this active and adventurous career will be found in "The Life of General Sir Howard Douglas," by S. W. Fullon, published by Messrs. John Murray in 1863.—EDITOR.

FIRST CHAIRMAN OF THE
ROYAL UNITED SERVICE INSTITUTION

THE HIGHER STUDY OF WAR IN THE ARMY

By MAJOR-GENERAL SIR CHARLES W. GWYNN, K.C.B., C.M.G., D.S.O.,
late Commandant of the Staff College, Camberley.

IN his remarks at the close of Admiral Boyle's lecture on "The Higher Study of War in the Services," Sir George Milne said that it was difficult to separate that subject from "The Higher Direction of War."¹ It is, in fact, very difficult to define at all exactly what we mean by "Higher Study of War," especially in the Army, and it is questionable whether anything is to be gained by attempting to arrive at an exact definition. Certain aspects of what might be called the higher study of war for an officer of one branch of the Army may be a commonplace technical matter in another branch. The higher study of war implies rather broadening the basis of study than the study of some particular aspects of war. Similarly the higher training of an officer implies broadening the range of his experience.

Those who have to lead the Army or who have to advise on the "Direction" of war must have a thorough grasp of everything on which the efficient working of the Army depends, within its own organism, in co-operation with the other Services and in relation to the resources of the Empire. They cannot, of course, be technical experts in every matter, but they must know enough to realise what parts the experts can play and how such parts can be harmonised and kept in due proportion.

To acquire such an all round grasp entails years of study and variety of practical experience. It is surely dangerous to look on the higher study of war as something which can be deferred to a late stage in an officer's career.

It is in his wider and more detailed knowledge that the professional differs from the amateur strategist. An intelligent man, if he has studied war at all, can form a correct idea where the application of force would prove most effective. It requires the professional to judge whether it is possible to employ force effectively at that point within the limits of time and resources which are involved. His wider knowledge also enables him to understand the factors affecting the enemy's power of counter-action.

¹ R.U.S.I. JOURNAL, May, 1931, p. 375.

The extent to which considerations of detail enter into the larger problems of war makes the representatives of each Service in many respects amateurs as regards the conditions which govern the action of other Services. But the higher study of war in one Service implies a recognition of the elementary conditions which govern the co-operative action of the others, quite as much as a knowledge of the larger problems affecting the role of each Service.

It is by personal contact between officers of the three Services at a comparatively early stage in their career and by working out the details of problems together that they will realise their own limitations and acquire mutual confidence in each other's opinions.

If we accept the idea of breadth rather than height it supplies a logical justification for the study of detail and larger questions simultaneously. Within reasonable limits it makes the order in which knowledge is acquired immaterial provided an officer is given facilities for keeping himself up to date. The broader his initial training is made, the more will an officer be enabled to draw instruction from subsequent experience. It also helps us in solving the difficult problem of how to fit periods of instruction and varied experience into careers which entail specialised knowledge. This conception of breadth forms, I think, the basis on which the Army system of higher education is founded. The latter is a growth of considerable age initiated and extended as the result of shortcomings revealed in war and adapted to the special complexities of army organization, complexities constantly increasing in number.

At the risk of labouring the obvious it may be well to review some of the factors which makes the organization of the study of war a different problem in the Army and Navy.

The primary factor is the number of arms and services into which the Army is divided. In each branch the technical training of the officer presents a different problem and is acquired separately. It is true that at an early stage an officer must realise how much depends on the co-ordinated working of the various components of the Army. At first, however, he is mainly concerned with the assistance required in carrying out his own tasks, rather than how the machinery to provide such assistance can be put in motion. The study of the working of the Army machine as a whole represents an intermediate stage in the study of war which has no exact counterpart in the other Services. For this study officers of the various branches must be brought together fairly early in their career to learn each other's methods and problems.

The second factor is the wide distribution of Army units in varying proportion, which adds immensely to the difficulty of collecting officers for centralised courses.

Thirdly, the units of the Army are, almost all, permanently in commission, albeit often with nucleus crews. The technical training of the officer in the work of his own branch cannot be carried out entirely in his own unit and he must attend courses, during which time one of his colleagues must do his work.

Without pressing the point further it is easy to see how much more difficult it is in the Army than in the Navy to collect officers for courses; while at the same time, in order to bring officers of the various branches together, it is necessary that the study of the working of the Army as a whole must be conducted at a highly centralised course.

Now in the Army the action of all its component parts is set in motion and controlled by the Staff acting under the direction of the commanders. The Staff is no longer merely a channel by which the orders of the Commander are conveyed, although that is still a primary part of Staff functions. It is rather a body of subordinate managers controlling the working of different departments in the establishment in accordance with the policy of higher authority. The different branches of the Staff deal with different sets of duties but the officers of the Staff must be interchangeable between its various branches which are, moreover, intimately connected in their work. It is essential, therefore, that the Staff officer's study should cover the widest field, consequently officers of the Staff must study war in its widest sense from an early stage in their training, whether that training is acquired at the Staff Colleges or by practical experience.

It follows that in the Army the organized higher study of war turns on the training of the Staff; and as commanders must have the same breadth of experience in order to direct the activities of their Staffs, there is an increasing tendency to find commanders from the ranks of trained Staff officers.

It is fortunately true that officers can still rise to the highest positions without having received systematic Staff training. These officers must, however, have displayed such attributes that they have been placed in positions which have enabled them to acquire by experience the widest knowledge of the working of the whole Army. Most of them will, I think, agree that they have missed something which would have assisted them in matters which lie outside the range of normal army experience.

The Staff Colleges, in addition to being schools of instruction in the technique of Staff work are military universities where student minds are directed to the study of larger problems, and where representatives of all branches of the Service can rub shoulders and mutually educate each other. It is necessary to have a clear realisation of the separate functions of the Staff Colleges, as schools and as military universities. If they

were only schools a shorter course would suffice as in the case of the other more homogeneous Services. A university course requires time to develop its effect, and any one connected with the Army Colleges would regard the shortening of the course as a very retrograde step in view of the great development in confidence and breadth of vision shown by students in their second year.

The fact that systematic higher education in the Army centres round the training of the Staff sometimes gives rise to the mistaken impression that it only concerns the Staff. It is true that for practical reasons a limited number of officers only can receive this special training. They must, therefore, be treated as a leaven to work on the remainder of the Army. Commanders and Staff are thus charged with the duty of spreading a common doctrine throughout the Army, not merely an operational doctrine, but one that affects every aspect of its employment.

Common doctrine in its widest sense means the establishment of a sound and instructed military public opinion. Incidentally, military public opinion may affect the action of those responsible for the higher direction of war, by strengthening the hands of accredited advisers.

The Army system aims at broadening the outlook of all officers from the start in order to increase the receptivity of their minds and encourage the habit of thought. It is for this reason that the curriculum at Sandhurst and Woolwich has recently been revised and brought more into line with university education. For the same reason University candidates are welcomed.

When an officer joins his unit his first task must be to acquire a knowledge of the technique of his own arm or service, although he should soon be brought in contact with the functions of other branches; especially in relation to his own. If the officer shows any real aptitude he is soon placed on the list of potential candidates for the Staff College and receives the assistance of the Staff in preparing himself for the Staff College examination. Nevertheless most of the work of preparation depends on his individual exertions. It is easy to scoff at examinations as a reliable test, but they do imply study. Their value in this respect, both to successful and unsuccessful candidates cannot be ignored.

Although entrance to the Staff College depends ultimately on examination results, no officer can be admitted unless he is certified to be a thoroughly good regimental officer. The system of nominations also secures the admission of outstanding regimental officers provided they pass the qualifying standard.

So far the system has dealt with the bulk of the Army and the selection of the material for the leaven. The essential features of the

Staff College course need not be given in detail, and it is only necessary to emphasise that it is, to a greater degree than Admiral Boyle suggests in his lecture, a step in the higher education of the officer, largely because of the contacts made during the course between the different branches of the Army, with officers of the other two Services and with those of the Indian Army and Dominions.

When an officer completes his Staff College course he goes back, for at least a year, in most cases, to regimental duty; partly for his own benefit but largely in order that he may assist in imparting to others what he has learned—the spread of the common doctrine. After that he is given an opportunity of acquiring experience in both the administrative and general Staff sides of Staff work. Even in junior appointments, especially if he is employed at the War Office, he is brought in contact with the largest problems and the relations of the Army with the other Services and civil life.

By the time he has completed his first period of Staff employment, the more able the officer the greater will be the demand for his services, both on the Staff and as a regimental officer. It becomes, therefore, increasingly difficult to liberate him for further long courses of instruction. Speaking generally the fullest development of a Staff officer's outlook as he reaches the senior ranks must be gained by experience and by working out practical and theoretical problems at exercises carried out under the direction of the War Office or Commands. These exercises constitute an integral and important part in the higher training of the Army.

Apart from the Staff it is fully recognised that regimental officers, both of the fighting units and of the technical services, should also possess a broad outlook in order to secure the most efficient working of the Army as a whole. The Senior Officers' School is maintained largely with this end in view as well as for the spread of common doctrine. It is a meeting ground for representatives of all the activities of the Army and Staff officers are not exempt from the course. Moreover, it becomes increasingly important that a good proportion of commanding officers and senior officers in departmental services should have Staff training in order to raise the standard of education of the Army.

The Imperial Defence College, designed as it is for the co-education of representatives of all the Services which co-operate in the concerns of war, lies, perhaps, outside the scope of this survey. That it will provide a super-leaven to work on the leaven of the Army and further broaden its outlook is certain. Much of its utility, however, will depend on the breadth of the previous training of the officers who attend the

course. It is essentially a continuation course rather than a new point of departure.

On the whole, the Army is well satisfied with the system under which it works and the competition to take advantage of the opportunities for higher education now offered could hardly be greater. The chief demand is for an increase in the number of those to whom opportunities can be given at the Staff Colleges.

It has also often been suggested that the Staff College course should be carried out in two parts, separated by a period of practical experience; the first part to be reserved more exclusively for junior Staff training, and the second part in the nature of a war course and higher training suitable for officers who had gained more experience.

These proposals, and variants of them, have received sympathetic consideration, but they are hedged with practical difficulties. Space does not permit a full discussion of the "pros and cons" but some of the less obvious practical difficulties may be mentioned. For example, it is often overlooked that as theoretical training is of little value without subsequent practical experience, the numbers of students receiving Staff training must bear some relation to the number of peace time Staff appointments in which experience can be gained. Admittedly a number of first-rate officers miss the chances of higher training. But to train more students than can be given opportunities of Staff employment might well produce unsatisfactory consequences, and increase rather than diminish the number of the disappointed. It will, I think generally be found that the exclusion of very good officers is due to their being so involved in other interests and duties that they leave their preparation too late. Is it not the duty of Commanding officers to assist by bringing pressure on their best officers to prepare themselves for Staff training?

Again, the difficulty of making officers available for the second part of a divided course is hardly realised. Solutions put forward are often applicable only to a limited number of branches of the Army and to certain stations. Apart from the obvious expense and difficulty of collecting officers again, when once they have scattered over the world, it is overlooked how insistent is the demand for the services of a very good officer, both on regimental and Staff duties, as he becomes more senior; and the demand varies at different stages of seniority, according to the branch of the Service to which he belongs. The business of selecting those suitable and available for the second course would be unenviable, and it could not be done on an automatic scheme.

Admiral Boyle has suggested a shorter course for still more senior officers. The difficulty of collecting suitable officers would be even greater than in the case previously described. Moreover, it must frankly

be admitted that senior officers do not form the best material for theoretical instruction. If they are set to work out problems they will miss the assistance of subordinates in matters of detail; and the solution of problems will often turn on detailed data. They may even become so absorbed in detail which requires expert subordinates that they will lose their sense of proportion as well as waste time. On the other hand, general discussion and lectures without the study of concrete problems tend to the neglect of essential details and the formation of superficial conclusions. The War Office and Command exercises now held, where senior and junior officers work in common on large schemes are expressly designed to fill this need.

Much emphasis has been laid on the influence of the Army Staff Colleges on the higher education of the Army as a whole. Admiral Boyle in his lecture did not give them so much weight. Is that partly because the R.N. and R.A.F. Colleges are comparatively recent institutions? Will not the influence of all the Colleges continue to increase as officers who have studied there reach the highest ranks in increasing numbers? Will not the co-education now in vogue at the Staff Colleges have a great influence on the better understanding between the Services: more especially when supplemented by the Imperial Defence College?

Before the war the Army had realised the necessity of broadening the basis of study and had taken steps accordingly in many directions. Admittedly the extent to which this broadening process was necessary had not been realised, nor had all the implications of a world war been foreseen. Moreover, the steps taken had not had time to exercise their full effect. Still, on the whole, the record of those who were then responsible for the reforms of the Army system and of those who were its products compares favourably with that of those who grew up outside the system.

Since the war the system has been much improved, but it remains in essentials as it was, nor does there appear to be any reason why it should be drastically recast. It is designed to produce good team work. For that every member of the team must have a thorough knowledge of the game and of each other. Captains are chosen, not so much for special skill or knowledge beyond the capacity of other members, but for judgment, experience and power to control their teams.

ECONOMIC PRESSURE OR CONTINENTAL VICTORIES

By CAPTAIN B. H. LIDDELL HART.

On Wednesday, 28th January, 1931.

COLONEL THE LORD AMPHILL, G.C.S.I., G.C.I.E., in the Chair.

THE CHAIRMAN introduced the Lecturer stating that his name was known to all who claimed to be students of military science, not only in this but in other countries, and that his views commanded respect even among our old enemies, the Germans, who had translated them into their own language. Every serving officer, moreover, must possess a Manual of Training which was largely the work of Captain Liddell Hart: his views on military training had been adopted in a number of foreign countries.

LECTURE.

THE substance of this lecture is not concrete but fluid. Even though it may tend in a certain direction and crystallize into a certain form, it is in no sense cast in a rigid mould. It propounds hard questions but only suggests possible answers. Far from being a new doctrine, it is really a liquid solution which may cleanse old ideas, useful within their limits, that have become encrusted with convention and have ossified into dogma.

The questions I shall raise are the outcome of study in the history of the last war that has been proceeding side by side with an extension of a personal study of other wars and of the general history of warfare.

Such study leads to the belief that the differences between the last war and other wars are less marked than common opinion would suggest. Its very title "The Great War" is at least as old as the Vth century B.C., when it was given to the Graeco-Persian War. Again, the title as applied to the Napoleonic Wars lasted until the powder trail of the latest of these so-called Great Wars was being laid. If nothing can apparently shake the ego-centric habit of speaking colloquially of 1914-18 as "The Great War," we may at least hope that it will fade from the pages of our histories before the next war arrives.

On the other hand, one is struck by the contrast between our share in the last war and the role this country has played in its past wars, those wars from which emerged the British Empire—the Empire which even in one's boyhood seemed to splash the map of the world with red, and now in one's disillusioned maturity seems as precarious a pink as the rouge on a woman's cheek. Perhaps it may likewise be renewable, if not as easily renewable.

In the last war we proclaimed, if we did not fully maintain, our intention to fight to a finish, until the German armies were beaten to the ground and the German Emperor hanged for his misdeeds. But we at least persevered with this intention until the enemy's power of resistance was exhausted under the compound pressure of several factors among which the historian must take account of, even if he does not allow equal weight to, military defeats, blockade, social disturbance, propaganda, and the allurements of Wilson's "Fourteen Points."

How far we strained ourselves in achieving this collapse by exhaustion of the foe we can gauge even better, for worse, than twelve years ago. With all too prophetic aptness it was said that in a war of attrition—that is of the single-minded attrition preached and practised in 1914-18—there would be neither victory nor defeat, only a common loss. To-day we are suffering not only from exhaustion of the body, political and economic, but from exhaustion of the spirit. This indeed, has been the gravest symptom and is to be traced all too clearly in our post-war history. The dual cost of the Somme and of Passchendaele, which are so often excused and even acclaimed for their coincident drain on the enemy's man-power, has been deducted from our moral power. There for a generation, if not for ever, has been sunk the faith that created the Empire. And even if a moral recovery should come it is almost inconceivable that we could recover the political and economic consequences of the original moral bankruptcy.

If the adoption of this fight-to-a-finish formula was the hall-mark of the last war, its visible embodiment was our vast citizen army. For the first time in our history we poured the nation into the army. Here was the great cleavage between this and our past wars. We are apt to take for granted its necessity. But it is worth while to ask if it was a necessity. Did Germany single us out as the main enemy any more clearly than Napoleon? Was she any more set on crushing us than Bourbon France had been in the XVIIIth century, or than Napoleonic France early in the XIXth?

But we do perceive that in the last war there was a new relation with our allies. We were tied to them both in policy and strategy as never before. We became one with them and subordinated our

policy to theirs. Some would say that we were not even co-equal partners with them, save in so far as it was by the free will of our leaders that we were committed to following the dictates of a Continental strategy which drew us willy-nilly into a policy foreign to our traditions.

The mud of Flanders was symbolical. In past wars we had put our foot in it—physically. Before the last war even began we had again put our foot in it—this time metaphorically and mentally. And, during the war, we threw our whole body into it. The immediate chain of causation is to be traced through Sir Henry Wilson's pre-war affiliations, Lord Kitchener's summons to arms, the General Staff's haste to reach France, and General Joffre's haste to reach Germany, down to its ultimate destination in the swamps of Passchendaele. Thither we guided and there we spent the strength of England, pouring it out with wholehearted abandon on the soil of our allies.

It was heroic, but was it necessary? It was magnificent, but was it war? A supplementary yet separate question is whether it even benefited our allies in the long run. Did we sacrifice our security, our mortgage on the future, for a gesture? Was there adequate reason why we should have changed our traditional policy, a policy that has had a longer run on the world's stage than any other and a uniquely successful run? Why did we change it? These are questions that deserve consideration and demand reflection.

I can find in the conditions of the war no satisfying explanation of our change. We have usually had allies, and rarely such strong allies. We have usually been regarded by our opponents as the main enemy, the central prop of the alliance opposed to them. We were still, when the last war began, the strongest commercial and financial power, and thus fitted to serve as the economic pivot of the alliance. We were still an island; air development had not yet imperilled the unique advantage of our insular security. We still had the strongest Navy, providing us with a shield and the alliance with a saw—a fleet is not fitted to be a sword. Many of our wars have found us in a precarious state in regard to our Navy, our economic strength and our allies. Rarely have we been so favourably placed as when we entered on the last war—as none have left us so unfavourably placed when we ended it. In past wars our enemy has often lain opposite our ports and on the flanks of our trade routes. In the last war we lay like a gigantic breakwater across the enemy's seaward approaches.

In reviewing these conditions no fundamental cause for a change of historic policy seems to appear. Hence one is inclined to find it in a change of fashion—in the military mode of thought inspired by Clausewitz. That we adopted it is only too clear from an analysis of

our pre-war military text-books, of strategical memoranda drawn up by the General Staff at home and in France during the war, and of the diaries and memoirs of the dominant military authorities published since the war. They are full of tags that can be traced to Clausewitz, if often exaggerated in transfer. We seem to have adopted this mode without asking whether it suited our complexion. It is an ironical if perhaps natural coincidence that in borrowing our military headgear from Germany we also borrowed its contents, the doctrines of Clausewitz.

Foch took his basic theory almost straight from Clausewitz, while carrying it to a more extreme pitch. Because he did so much to mould the strategic thought of France before the war—and, by consequence, the strategy of England in the war—it may be illuminating to examine his interpretation of Clausewitz.

The three dominant theories in Clausewitz, and in Foch, are (1) the theory of "absolute" warfare, the corollary of which was "the nation in arms"; (2) the theory of concentration against the main enemy, who must be overthrown first; and (3) the theory that the armed forces form the true objective, and battle the true means thereto. Both Clausewitz and Foch cited Napoleon and Napoleonic warfare in support, the main support, of their theories. I propose to examine these theories briefly, by cross-examination of their principal witness.

In advocating the principle of unlimited violence, Clausewitz asserted that "he who uses force unsparingly and regardless of bloodshed must gain his object, if his adversary does not do the like," and implied that limitation was due to "a feeling of humanity, the worst of all errors." It is curious that here he failed to consider that it might be due to political acumen based on wise self-interest. He ascribed the victories of the French Revolution to the fact that it "had thrown the whole weight of the people and all its forces into the scale." Foch in turn ascribed the defeat of France in 1870 to its neglect of the theory "of absolute war which Napoleon taught Europe." "To a people in arms, organised for conquest, invasion, a fight to a finish," France had opposed an army that did not embrace its whole manhood and an idea of war based on limited or "diplomatic" objects. In the eyes of Foch, as of Europe, the war of 1870 established Clausewitz's theory beyond doubt.

But did it? Has there ever been such a thing as absolute war since nations ceased to exterminate or enslave the defeated? XIXth century Europe had passed beyond the Mongol stage. If the term "absolute war" has any meaning it is that of a fight until the capacity of one side for further resistance is exhausted. In practice, this may well mean that its conqueror is on the verge of exhaustion, too weak to reap the harvest of his victory. In other words, absolute war is a war

in which the conductor does not know when to stop. It implies that the end is pursued regardless of what lies beyond. The conductor allows the fighting instinct to usurp control of his reason. If this be the logical definition of absolute war we may perhaps view St. Helena as the proof that Napoleon was its prophet. And to-day also we know where it has led us. But it is certain that Bismarck did not share it in 1870 whatever the delusions his successors derived from a victory that was quick and cheap. His principle, like that of the statesmen who built the British Empire, was to make war with profit and make peace when a war ceased to promise profit.

Next we turn to the theory of striking at the main enemy first and directly. Two phrases of Napoleon's have been repeatedly cited in support of it. "Austria is the main enemy: Austria crushed, Spain and Italy fall of themselves. We must not disperse but concentrate our attacks." "I see only one thing, the mass; I try to destroy it, feeling sure the accessories will fall of themselves." Both phrases assume an entirely different aspect if we trouble to discover the circumstances in which they were delivered. The first, moreover, has been mutilated. It was part of an appreciation made by Napoleon two years before his first campaign of 1796. After saying that Austria was the main enemy he actually added—"it is thus necessary that as far as possible our action should strike directly or indirectly at this power." He did *not* propose to strike at it direct. "In order to deal with Austria, we must crush Piedmont, a small State with no strong national feeling Austria must then bring troops from the Rhine to defend herself in Italy and our army of the Rhine will be able to take advantage of the weakening of the Austrian army that confronts it."

Equally significant is the way Napoleon actually conducted his offensive in Italy, where he was faced with both the Piedmontese army and a stronger Austrian army. Carnot, who was the real creator of the doctrine of striking at the main enemy, urged that the French should march directly towards Milan and the Austrian army. Napoleon flatly disagreed. Instead, he preferred to strike at the joint between the two armies, frighten the Austrians into paralysis, and then turn and knock out the Piedmontese army, the weaker partner. The result perfectly justified his calculation.

The second phrase must also be judged in the light of the circumstances of its origin. It was uttered in 1797—to the Austrian generals with whom he was negotiating an armistice. They were scarcely the people to whom he would reveal his real thoughts. The glib phrase was spoken at the end of the campaign in which he had, first, overthrown Austria's weaker partner; then enticed successive parts of the Austrian

army to his chosen ground in Italy; and, in each successive phase, had concentrated against a fraction of each part. Napoleon's aim had naturally been to "destroy the mass," but his method had been to destroy it piecemeal, beginning with the weaker parts—the "accessories." He did not reveal to his opponents how he had beaten them.

This campaign also affords us evidence in examining the third theory of the alleged expositors of Napoleon. Clausewitz, with that tendency to dramatic generalization which obscured his many discerning reflections, declared that while "there are many ways of achieving the political object of war the only means of achieving it is by combat, and everything is subject to a supreme law, which is the *decision by arms*." The distinction between ways and means was too subtle. He appreciated that the theoretical ideal of a decisive battle, cancelling everything else, must be subordinated to the question whether such a way was practicable and profitable. But his followers thought only of the ideal, and caught hold of such phrases as "Battles are the deciding factors, all other activities being merely its appendages." Thus Foch, quoting Clausewitz, exaggerated and narrowed his meaning—"No strategy can henceforth prevail over that which aims at securing tactical results, victory by fighting." Instead of seeing tactics as a tool of strategy, he made strategy merely a conduit pipe to tactics. "Battle is the only *argument* in war, therefore the only end that must be given to strategical operations."

One cause of this narrowness seems to have been that Foch and his contemporaries concentrated their study of military history on the details of Napoleon's and Moltke's campaigns without a broad historical background, and without attention to any of the Great Captains before Napoleon, the very sources which Napoleon had recommended for study.

With curious aptness did Foch compare his own recommended form of study to the use of a microscope. It is even more curious how it misled him in the very campaign he chose for study. For as Professor Spenser Wilkinson has remarked in his latest book, "The striking feature of the campaign of 1796 is the absence of anything that could be called a general engagement." Napoleon, the man who is exalted as having made strategy merely a route to battle, thus actually achieved what is by general recognition the unsurpassed masterpiece of 1796, by pure strategy without a battle. By skilful threat and mobility he nullified the need for battle. It is significant that he himself confessed at St. Helena that although he had subsequently fought sixty battles they had not advanced his knowledge of war beyond that of his opening campaign.

Again, let us cross-examine our witness as to the higher strategic aims which governed his later campaigns. Austria out of the war,

England became in Napoleon's eyes the main enemy. The French Government was preparing to invade England. Did Napoleon agree with the practicability of this direct military attack? Far from it, he proposed two alternatives in a remarkable letter of February, 1798. One was a conquest of the German coast in order to cut off British commerce from central Europe. The other was an expedition to the East, also with the idea of ruining British trade. Thus both, be it noted, were inspired by the idea of economic pressure.

As the first was then within reach by diplomatic action alone, the second was adopted as the line of military action. Instead of the romantic irrelevance that it has been sometimes pictured, it was a shrewd calculation, based on the facts that the British Fleet had abandoned the Mediterranean since 1796 and had been disorganized by two serious mutinies. That Napoleon was ultimately foiled in his eastern plan, by England's sea power, does not affect the question of what he thought was the most hopeful way—the indirect way—of striking the main enemy. And only by mischance was he foiled—because his own Government failed to make an adequate diversion towards Ireland and because the British Government were thereby emboldened to send a fleet to the Mediterranean, overriding the opinion of the Sea Lords. In this case the Cabinet had a firmer grasp of strategy than the Admiralty, while they found a uniquely brilliant agent—Nelson—for its execution.

The true grand strategy of Napoleon cannot be better expressed than in the words of the late Sir John Seeley, the famous Regius Professor of Modern History at Cambridge:—

"His conquests in Europe are made, as it were, accidentally, and he treats them always as a starting point for a new attack on England. He conquers Germany, but why? Because Austria and Russia, subsidised by England, march against him while he is brooding at Boulogne over the conquest of England. When Germany is conquered, what is his first thought? That now he has a new weapon against England, since he can impose the Continental System upon all Europe. Does he occupy Spain and Portugal? It is because they are maritime countries with fleets and colonies that can be used against England. Lastly, when you study such an enterprise as the Russian expedition, you are forced to admit, either that it had no object, or that it was directed against England. But this view escapes most historians"—because their outlook was obscured by Europe, and the obvious conquest of Europe by Napoleon.

One might add that this view has escaped most military writers, both because their outlook was obscured by Europe and because they

over-estimated the attraction of battle for Napoleon. It is more astonishing that it should have escaped so many British students of war.

When Austria was the main enemy, Napoleon struck first at her weaker partner, and then in the direction where she could oppose him least effectively. When Britain was the main enemy he did likewise. In either case he led through weakness to strength. Any other strategy is merely to play into the opponent's hand. Against Austria he employed military action, as there was little scope for economic pressure. Against Britain he employed economic pressure, as there was little scope for military action. In each case his approach to the main enemy was indirect.

Britain foiled him as she had always foiled her main enemies—becoming Ever-Greater Britain in the process—by a grand strategy that, similarly, was indirect although it took a different form. Our traditional form—suited to our national conditions.

I propose, briefly, to examine this traditional grand strategy from the time when the discovery of the New World shifted the economic, and in consequence the political, axis of Europe westwards to the Atlantic coast line. As a result this island was shifted, geographically, from the circumference to the centre. Characteristically, perhaps, we were slow to seize the opportunity. Thus a Greater Spain and a Greater Portugal arose a century before we took up the idea of a Greater Britain, although English sailors were actually ahead of Columbus in reaching the American Continent. Even Holland, though it did not gain its own independence until the end of the sixteenth century, was so quick off the mark as to beat us for third place.

Our awakening in the Elizabethan age was economic in origin. We discovered the profit of becoming an unlimited company of state-protected pirates. Economic motives led us to exchange our old habit of military aggression for a new one of naval aggression. And when we developed this into colonization, the creation of a Greater Britain, we succeeded in overtaking and overcoming our rivals because we alone steered clear of the delusive attraction of "Continental victories." But not of war. We cannot burke the fact that it was through war our profits came, through war our capital grew. The process began when the Elizabethans invested their capital in expeditions that were bare-faced piracy, although the process later assumed a national complexion.

While the impulse to "get rich quickly" inspired many who supported the expeditions to the Spanish Main, these also had the deeper purpose of breaking Spain's economic monopoly in the New World, and thereby led to open war. The removal of the veil of nominal

peace thus gave to the sea campaign an air of respectability. Spain's reply took the form of direct attack—by invasion.

In the struggle, sea-mobility was pitted against land strength. The gigantic shadow of the Armada is apt to obscure this fact. The Armada was used merely with a view to enabling Parma's veteran army, the supreme army of the time, to cross from the Spanish Netherlands. How did England counter the danger? Drake, Hawkins and Frobisher—the most experienced "warriors"—advocated a strategy in which concentration should be subordinated to mobility and surprise. Drake's raid of 1587 on Cadiz had not only set back the Armada a year, but had done permanent injury to its morale. Now, in March, 1588, Drake urged that "with fifty sail of shipping we shall do more good upon their own [the Spanish] coast than a great many more will do here at home; and the sooner we are gone, the better we shall be able to impeach them." But Elizabeth came out as the upholder of safe concentration and of a direct answer to the attack. Thus time was lost, and the Armada gained the English Channel, placing the English at a grave disadvantage. It was by "worrying" tactics that we turned the scale, and by the useful use of fireships that we completed the Armada's disintegration.

But although indirect tactics had foiled the menacing power of Spain, indirect grand strategy might have broken it if pressure had been applied less spasmodically. Spain's military power was based on her economic resources in the New World. The treasure-fleets were her vital artery. This was realized by the naval writer, Sir William Monson, who had served as a junior officer against the Armada. But its application was left to Cromwell and his "amphibious" general, Blake. Cromwell had been attracted by the dream of continental victories, with more justification perhaps than anyone since, but he did not let it warp his judgment. A practical commercial outlook guided him even in his negotiations towards a great Protestant league. And the war with Spain was the outcome of Spain's embargo on English shipping.

What form did Cromwell's action take? He certainly sent a small expeditionary force to the Continent, having made an offensive alliance with France. But this was to be used not against Spain directly, but to strike at her root in Flanders. Here he combined two, indeed three, aims. He wished to deprive Charles II, then in Flanders with the nucleus of a Royalist army, of a base of invasion; to gain permanent possession of Dunkirk, as a safeguard to his control of the Channel; and he also shrewdly calculated that it would provide him with a lever to exert future pressure on his temporary ally.

But this Continental expedition was a secondary operation. Cromwell's main line of action was to send Blake's fleet to cruise off the

Spanish coast and intercept the silver ships from America. In September, 1656, a treasure-fleet was intercepted off Cadiz and five out of eight ships, with £2,600,000 worth of silver, were sunk or captured. The following April, Blake intercepted a larger treasure-fleet of sixteen ships, sailed into the harbour of Santa Cruz in Teneriffe, where it had taken refuge, and destroyed the whole fleet without losing one of his own. The effect was far more decisive than that of many of our most famous victories. For, as Admiral Richmond has pointed out, "Spain's finances were crippled, her military operations were thereby stopped. Unable to pay her armies, the invasion of Portugal came to a standstill, and Portugal was saved on the brink of disaster. Spanish power in Europe was struck at its very roots." In Sir John Seeley's words, "Spain fell never to rise again, and no measure taken by England had for centuries been so momentous."

In the ruin of Spain's power, Cromwell completed what the Dutch had begun. From her eighty years' struggle for independence Holland emerged not merely in a state of independence but as one of the great States of Europe. Her greatness lay in the fact that she had become Greater Holland, with a world-wide chain of colonies. This was due to the indirect form of her grand strategy, content to stand on the defensive on land, while she took full advantage of the opportunities which war afforded to attack the overseas possessions of Spain and Portugal. She emerged from the war as much enriched as her enemy was impoverished.

But her success brought her into trade-rivalry with England, before she had time to consolidate her new estate. In this struggle, moreover, England had the geographical advantage of position—direct and indirect. While she lay like a breakwater across Holland's sea-inlets, Holland had an exposed land-frontier. It is significant that English grand strategy embraced no direct attack on Holland.

The first war, 1652-54, under Cromwell's direction, began on the English side with a purely indirect attack—on the Dutch convoys and herring fisheries. The Dutch, feeling the pinch, resorted to a direct naval attack, and a series of battles followed in which the advantage eventually inclined to the English. But it was their continuous trade losses which mainly drove the Dutch to seek a disadvantageous peace.

The next war, under Charles II, was again naval, and although the issue of battle turned in Holland's favour she gained no decisive profit. But in the third war, 1672-74, Charles II found a continental ally, France, and so could benefit by his opponent's handicap of a land frontier, while limiting his own expenditure of force. This was also limited by his own people, who disliked the war, and eventually compelled

him to withdraw from it. Yet it was England who drew the ultimate profit, extending her colonies and her trade, whereas Holland, although checking the land invasion and successful in her sea actions, was irreparably exhausted by the double strain. From this point her decline began. Paradoxically, it was to be accelerated by a reshuffle which made England her partner. Her ruler, William of Orange, on gaining the English throne, drew a reluctant England into the Grand Alliance created to combat the growing power of France. The issue was to be as fortunate for England as it was unfortunate for Holland, in the long run. The energy of Holland was diverted into the channel of "continental victories," and her strength suffered by the strain. In contrast, England, while participating in these with limited expenditure, was able to reap the fullest profit by indirect economic pressure. She succeeded because her main enemy, Louis XIV, made "continental victories" his main aim.

The curtain now rose on the third, the last and longest, act of the great drama produced by Columbus. A Great Britain faced a Greater France, the creation of Colbert. In this conflict, the military assets were on the side of France. But geography gave Britain a natural asset, and her grand strategy created a mental asset.

In the first scene, the war of 1689-97, she failed to use it, for William III was obsessed with the Continent and concentrated his resources on direct military action. The war was notably indecisive, and unprofitably expensive to this country. The change came in the second scene, when Marlborough succeeded William as stage manager.

The war of the Spanish Succession has been aptly termed "the most businesslike of all our wars." The glamour of Marlborough's victories on the Continent has tended to obscure this fact, as well as the vital part played by our sea-mobility both in undermining the enemy's military power and in picking up permanent assets. When the war began, France was the first State in the world. When it ended, Britain had succeeded to this proud place at a comparatively trivial expenditure that yielded a magnificent dividend. In the main theatre on land she invested a very limited force, although multiplying it by the unlimited genius of Marlborough. It is significant that, in contrast to the British strategists of 1914-18, Marlborough encouraged every distant diversion which might react not only on France herself but on her Spanish partner. By our purposeful dispersion a dispersion of the enemy was created which we turned to advantage.

In the winter of 1703-04, the use of the Anglo-Dutch fleet for strong naval demonstrations led to the severance of Savoy and Portugal from the Franco-Spanish partnership. In August, 1704, the enemy's distraction was exploited by the capture of Gibraltar at the price of a mere

300 casualties. This success had more effect, immediate and permanent, than the victory of Blenheim the day before. For Gibraltar, a greater than Gallipoli, was not only the permanent key to the Mediterranean; in this war its possession by the British henceforth pinned down a large Franco-Spanish land force; furthermore, it split the naval force of France, locking up a third of her strength in the Mediterranean.

This achievement was followed up by a land expedition which won the whole of eastern Spain and then, if less wisely, penetrated to Madrid. It is interesting to note how even bad execution failed to mar the effect of good grand strategy. Marlborough profited by the diversion to clear most of Spanish Flanders, while the accession of Savoy to the Grand Alliance led to the French retiring in that theatre to their own border. The consequence was that in 1706 Louis XIV sued for peace on terms more favourable than those eventually won. He offered to give up his grandson's rights not only to Spain itself but to her New World possessions. The allies, however, had not learnt when to stop.

In 1707 Marlborough conceived a new indirect move, an amphibious stroke at Toulon, which he calculated would draw off all the French troops from Spain and thus enable this prop of French power to be definitely knocked away. Through bad execution on the spot the goal was narrowly missed, but the attempt put such fear into the French that they sank most of their fleet at its anchorage. Marlborough, moreover, was quick to devise an alternative stroke, the capture of Minorca, with the idea of gaining a base in the Mediterranean which would enable the Allied fleet to keep guard over Toulon and safeguard his land diversions in Italy and Spain. In his judgment, the fall of Minorca was more important than the coincident fall of Lille.

The true intent of Marlborough's strategy, often missed, was even more in what he planned than in what he did. Far from wishing to pursue the direct advance on France, in 1706 he had proposed to move his army to Italy. Again, in 1708, he proposed to slip down the coast, leaving the fortress barrier in his rear, and in conjunction with an expedition from the Isle of Wight, reach Abbeville, in rear of the French armies. Both these plans had to be foregone because his partners had no stomach for the calculated daring and originality of his strategy.

At the end of 1708 Louis XIV once more sued for peace, and it is clear this time that his yielding was due far more to economic pressure than to military action. While the battle of Oudenarde made no decisive change in the military situation, the grip of sea-power on French trade and on imports of food had reduced France to a state of grave distress. It is significant that Marlborough favoured acceptance of Louis's proposals, which Britain's partners and her politicians rejected,

so deluded were they by the mirage of absolute victory in the field. It is equally significant that when the war was resumed he thought of continuing it by sea pressure alone.

But the mirage had too strong an attraction. And its consequences were far-reaching. The French were driven to a military effort of desperation. Marlborough was drawn into his costliest battle, Malplaquet, and from nominal defeat the French recovered their morale. Henceforth the Allied prospects steadily contracted, while the growing success of the French was only limited by the past strain on their resources. They even won the last battle, the great victory of Denain, and yet, because of exhaustion, lost the peace, even if they retained part of what they had originally been willing to surrender. Britain not only kept Gibraltar and Minorca but was ceded Nova Scotia, Newfoundland and Hudson's Bay. More immediately profitable, she broke the Spanish trade monopoly in South America, being given the lucrative if disreputable right of slave-supply. Britain might have gained still more from the war if she had pursued her own grand strategy more strictly. And she might have ended it sooner. For the maintenance of the French and Spanish armies depended on the supplies of bullion that came from Spanish-America. Admiral Wager's solitary interception of one treasure squadron in 1708 did much to paralyse Spain's military effort and to cancel the battle of Almanza, preventing the Franco-Spanish army from following up its defeat of the allies. It helps us to gauge what might have happened if a strategy of sustained interception, the cheapest force of action, had been applied. Perhaps it needed a Cromwell, still better a Cromwell bred at sea.

The interest of the war of 1739-1748 lies in the power of our traditional grand strategy to survive even the grossest mismanagement and to counterbalance even the worst chain of blunders. We began by attacking Spain indirectly through her trade source of strength, but when France entered the arena we relaxed this effort in favour of the use of sea-power as an auxiliary to the army. Our strategy was a compromise between direct military action on the Continent and colonial expeditions, and itself was compromised by the rusted state of the instrument. The more weight we threw into the Continental struggle the less effect we achieved, but when in 1746 we again sent a large fleet to the Mediterranean it hamstrung the French invasion of Italy. Moreover, when in the last phase of the war we renewed our indirect sea pressure in the West Indies it paralysed the enemy's trade. Our sea-power, in fact, nullified the military successes of Marshal Saxe in Belgium, as well as those of Dupleix in India, and compelled the French to accept a negative peace, a peace of mutual restitution.

The issue thus postponed was to be settled in the Seven Years' war, which saw the triumph of Greater Britain over Greater France, and established us in a position of economic supremacy that no subsequent failures could shake. The war began badly with the loss of Minorca and with menacing defeats in America and India. But then Pitt took charge, resharpened the military instrument, and vigorously carried out a grand strategy that became the purest example of our traditional form. Direct military effort on the Continent was largely replaced by subsidy to our allies. Meantime, under cover of direct sea-pressure on France, indirect military action was applied to the overseas roots of French power. When peace came in 1763 we had possession, cheaply won, of Canada, all the French West Indies, Bengal and all the French settlements in India, Senegal in Africa, Belleisle off Brittany, as well as Havana and Manilla taken from Spain. That Britain restored some of these conquests in the peace treaty was not because of necessity but because Pitt had been forced out of office by George III's jealousy.

In the American War of Independence our "deep land" strategy, committing land forces far into the interior, led to the disastrous surrender of Burgoyne's army at Saratoga, and this in turn to the entry of France and Spain into the war against us. Our entanglement prompted them to regain their lost colonial empires, and our own was more gravely imperilled than ever in its history. In the crisis Amherst, the chief military adviser of the Government, argued that "the future operations must be principally naval, to distress their trade and prevent their supplies from Europe," supplemented by a series of amphibious "attacks on every part of the American coast that is assailable." So long and so far as it was strictly carried out, this limited strategy against the American colonies, coupled with a defensive attitude towards our European foes, paid well. Only when Cornwallis was emboldened by success to extend its limits and launch a campaign of interior conquest, did the scales turn against us. And this reverse was equally due to the temporary loss of our sea superiority. When this was restored by Rodney's success in the West Indies, economic pressure had so impoverished the Americans that they jumped at the opportunity of making a separate peace, which gave us the opportunity to make a comparatively easy settlement with our European enemies. We had lost the American colonies, but we had preserved the Empire. If we had from the start put the money into naval force that we wasted on Continental effort—in America—we might have saved all.

The struggle against Revolutionary France and against Napoléon saw a renewal, and a renewed success, of our traditional grand strategy. This was applied by sea pressure on the enemy, by financial support

to all possible allies, and no turn of ill-fortune induced us to deviate from it towards a larger military effort. It was by lending sovereigns to sovereigns that we chiefly fought France on land.

At the outset we did, indeed, send an expeditionary force to Flanders. Its defeat was, perhaps, a blessing in disguise. For thereafter we eschewed the main theatre of war and employed our land forces for sea-based operations against the enemy's vulnerable extremities. Having made a collection of the French colonies, we ousted the French from Egypt and then used our army to aggravate the local centres of anti-French infection in Italy, Portugal and Spain. The "Spanish ulcer" poisoned the whole Napoleonic system, undoing all the victories achieved by Napoleon in the main theatre of war. Wellington's presence was of essential service—in extension of our sea-power—towards inflaming the ulcer and checking Napoleon's remedial measures. Wellington's actual battles played but a small and infrequent part in the process. His passive resistance in the lines of Torres Vedras did more damage to the French than any of his subsequent victories. Torres Vedras drew the French towards him and thereby gave the Spanish guerrillas a chance to tighten their grip in other parts. But his victories of 1812 led the French to contract their zone, this concentration in the north revived their power of resistance, and the struggle thereby became a gradual clearance instead of the more sudden and complete collapse which might have come if they had stayed in occupation of the whole country.

The war ended, Napoleon abdicated, without a British army setting foot in the main theatre of war. It is true that in 1815, after Napoleon's escape from Elba, we sent a contingent. But we easily forget that it formed barely one-twentieth of the allied force assembling in the theatre of war, and barely one-seventh even of the actual force that took part in the Waterloo campaign.

A romantic habit has led us to hide, and even hidden from us, our essentially businesslike tradition in the conduct of war. For this power of self-deception we paid heavily a century later. For a true view of our past might have counteracted the unbusinesslike allurements of the Continental theory. Our historic practice, as we have seen, was based on economic pressure exercised through sea-power. This naval body had two arms; one financial, which embraced the subsidising and military provisioning of allies; the other military, which embraced sea-borne expeditions against the enemy's vulnerable extremities. By our practice we safeguarded ourselves where we were weakest, and exerted our strength where the enemy was weakest.

I can see no convincing reason why we should have abandoned this practice, proved by three centuries' experience of warfare. To some of

my hearers what I have said may sound like heresy. It is certainly a repudiation of the doctrine of strategy accepted on the Continent. And if you read the writings of our ruling military leaders in 1914-18 you will find that they denounced as heresy arguments that were but a pale shadow of those contained in this lecture. Yet in the light of Britain's history who were the real heretics, the violators of tradition? Has any other theory than the one we have here traced the historic title to be called "British Strategy?"

In 1914-18 we fulfilled it in the naval and economic sphere, but in the military sphere we changed it for a revolutionary innovation, raising a huge army and employing the bulk of it for direct action in the main theatre of war. The cost is known, the benefit doubtful. And although this immediate military pressure certainly contributed to the enemy's eventual capitulation, as all pressure contributes, the neutral or impartial historian is coming more and more to the conclusion that our blockade was the more decisive factor. If anyone still doubts that it was the blockade which made a continuance of the struggle impossible, they might profitably make personal enquiry on the spot as to the rations on which the German armies tried to live in 1918, the still worse hunger which the people at home suffered, the effect of that suffering on the spirit of the people, and its inevitable reaction on the will of the men who were fighting.

I will end with a speculation as to what might have happened if we had adhered to our historic theory.

The original expeditionary force might still have been sent to France, in which case it would have played the role it did until the Battle of the Marne was past. Alternatively, it might have been sent to the Belgian coast as Lord Roberts and others suggested. In this case, from what we know now of the German plan and the German command's frame of mind, there is strong reason to believe that it would have dislocated the whole German plan against France. Dislocation would have been the more probable because of the rigidity of this plan. And the deduction is strengthened because we know what effect a mere brigade of Marines at Ostend and a Belgian sortie from Antwerp had upon the German command. How much more effective, too, would have been the Belgian army if fortified by the presence of the B.E.F.

But in any case, once the original invasion had been stopped, our historic theory indicates that our military effort would have been shifted elsewhere. Even if the bulk of our original expeditionary force had not been moved, all divisions subsequently available would have gone. Here one would remark that we might have raised Kitchener's "First Hundred Thousand," but certainly not his "Last," still less should we

have adopted conscription. Instead we should have developed our industrial capacity for supplying and munitioning our allies.

The shifting of our military effort to the Near East might or might not have availed to prevent Turkey joining the enemy powers. Assuming that it did not, the facts of the situation as revealed in the official history of the Gallipoli campaign seem to provide ample assurance that the Dardanelles could have been opened by a force equal to Kitchener's original estimate—150,000 men. Thereby the channel of munition supply to Russia would have been opened—to the almost certain prevention of her defeat. The Balkan States, even if they had not rallied to our side on the arrival of our army in the Aegean, would now almost certainly have come in. Their ardour would have been stimulated and their military strength increased by liberal and timely subsidies. The move up the Danube as advocated by Gallieni would now have been possible, obviating or rendering subsidiary the more restricted line from Salonika through Uskub. Serbia would not merely have been saved, but turned into a spearhead. In the light of 1918 we are able to gauge the effect of this compound menace and pressure on the ill-knit Austrian empire, ripe for disintegration. Italy's entry would certainly have been hastened and her penetrative power sharpened.

It will be asked—what of France and Germany in the meantime? France would have been compelled to remain on the defensive, much to her own and the general benefit. In the light of 1916 there is surely no reason to doubt her capacity to hold her existing line in the West—although by historical precedent even a failure to do so would not have been irretrievable. She would probably have been prevented from squandering her strength in those futile offensives of 1915, which irreparably damaged her army, and would have been able to take the offensive more promisingly as soon as there were signs of a loosening of the enemy grip. One may add that if Britain's adherence to her traditional strategy had been clear in the prologue to the war, there is some likelihood that France would not have rushed to the attack in August, 1914. And if she had stood on the defensive originally there is scarcely a doubt that the original offensive would have been foiled. The elder, and wiser, Moltke would scarcely have launched it under such conditions.

Germany would naturally have been quick to reply to a threat along the Danube line, although she could not have interfered with the earlier attack on Turkey. But the more troops she diverted to the Danube front, the more chance for France and Russia to exert effective pressure. A France that would have spent fewer men and a Russia that would have possessed more munitions. Moreover, only a large diversion of

German forces could have sufficed to withstand the compound strength of the Allied advance on Austria's weakest side, a side that geographically did not lend itself to defence.

It is not necessary, however, to envisage a sudden collapse of the Central Powers. Strategically they would have been in a similar situation to that of late October, 1918, but without the open side then existing on the north. So closely ringed round, economic pressure would have been felt the sooner, and would not have been alleviated by the new sources of supply that they tapped as a result of their 1915-1917 conquests in the Balkans and in the Ukraine.

Let us, however, assume that this many-sided advance, with more allies against fewer enemies, led merely to a stalemate. Even in that improbability, fidelity to our tradition instead of to Clausewitz would have led us to negotiate for peace—the usual ending of the wars from which we have benefited most. Into the negotiations we should have entered with our usual bargaining counters, and from them at least have emerged with strength less impaired than to-day.

Victory, in the true sense, surely implies that one is better off after the war than if one had not made war. Victory, in this sense, is only possible if the result is quickly gained or the effort economically proportioned to the national resources. Favoured by geography, it has been our distinction to excel in this wise economy of force. In a far-sighted fulfilment of the principle, looking beyond war to peace, lay the secret of our unbroken prosperity during three centuries. In fulfilling it we relied principally on economic pressure, the most economical form of pressure. In the last war the conditions of industrial civilization had made our enemy more susceptible to economic pressure than in the past. And because of geography our navy was better able to apply it. Yet for the first time in our history we made it a subsidiary weapon, and grasped the glittering sword of Continental manufacture.

DISCUSSION.

CAPTAIN E. ALTHAM, R.N. : The naval officer, naturally, is inclined to support the idea of economic pressure, because its application is largely his business ; and, on the evidence of history, the Lecturer has made out a very strong case for that policy. But is this not another instance of the necessity for reviewing history with considerable suspicion before accepting its lessons as being applicable to each and every occasion ; and is it not a fact that every war differs to a certain extent from every other war ?

If we had adopted this policy of economic pressure in the last war, and withheld more direct and immediate aid to our allies, it seems to me that we should have been relying on a weapon which was much too slow in the circumstances. Had we not taken military action, and direct military action at that,

in support of France when we did—I do not say necessarily in the way in which we did—nothing could have saved France from being overwhelmed by the weight of German military pressure before the slower weapon of our economic pressure could have had time to act. The result would have been that France and our lesser allies would have gone under at an early stage, and we should have been left to wage the war alone.

I cannot help feeling that the Lecturer has somewhat confused the utilization of naval forces for economic pressure—that is to say, for cutting off sea-borne supplies and perhaps financial succour to our enemy—and their use to give more mobility to our strategy. He alluded to the potentialities of a landing on the coast of Belgium, and to those of a better ordered campaign in the Dardanelles. In the light of after events, both suggestions have much to commend them, but they are not quite the same thing as this slow weapon of economic pressure by itself.

ADMIRAL SIR HERBERT RICHMOND: From the historical point of view, the Lecturer's sketch of our traditional strategy seems to be entirely correct, but, as Captain Altham has properly remarked, are the lessons of history applicable to the conditions of to-day? The heading of the lecture seems to me to be a little ambiguous; its title is "Economic Pressure or Continental Victories," yet the Lecturer did not appear to confine his attention to economic pressure. Really the bulk, or a very large number, of his examples appeared to be illustrations of the use of our forces in a manner in which they were given the utmost mobility, that is to say, land forces were put down in places where they could exercise considerable influence and be superior to the enemy opposed to them. That is not all economic pressure. Undoubtedly in the cases which the Lecturer quoted in regard to the wars with Spain in the XVIth and mid-XVIIth centuries, direct economic pressure was exercised, since we were cutting off certain supplies, incidentally, bullion. Those conditions are, I think, inapplicable to-day. As Mr. Fayle stated some years ago before this Institution when dealing with that subject, it was bullion that the Spaniards wanted. But to-day it is not bullion that passes. There is an entirely new factor in modern economic life, namely, credit. Credit did not exist in those days, and credit is a thing on which nations can exist for a very long time. It is extraordinary, for instance, how long German credit continued to last; the mark did not even begin to fall to its disastrous minimum until long after the war. Germany went on financing her operations and was able in some way or another to export either securities or goods—not very much in the way of goods—in order to import necessities from abroad. That is one difference between the economic pressure of the past and the economic pressure of to-day. Credit can now be maintained where bullion could never pass.

On the other hand, there is that use of military force which means putting it down in a place where it can strike an enemy's vulnerable point. That is a thing which we should have considered more than we did in the last war, and I should much like to hear military opinions as to whether our first five, or six, divisions were sent to the best point at the outset of the war, or whether it would have been better to have sent them where the Lecturer has suggested, that is to say to Antwerp, or somewhere on the coast of Belgium—for example, to Zeebrugge or to Ostend. Had this been done, would they have been a little isolated force exposed to being smashed by some superior body before dislocating the German plans? That seems to be the vital point, but one on which I can offer no opinion.

I am one of those who think in much the same way as the Lecturer in the matter of the Dardanelles. It seems that when Turkey entered the war a situation was created which gave us an opportunity to strike and weaken the enemy, and I believe the attack on the Dardanelles might have proved an operation of extreme value. As it was, the operation was conducted in the worst possible fashion; every precaution, which our ancestors probably would have taken in a similar case, such as surprise, concealment, and so forth, was utterly neglected.

Another point to which the Lecturer referred—one which I consider to be of the highest importance—is the question of munitions. We are, or were, a great manufacturing Power. Our French allies had lost a vast amount of their coal and iron deposits; the Russians were grievously deficient in munitions; they were already feeling the pinch in early December, 1914; and their difficulties in the field, I gather, were largely due to the fact that they could not supply their troops with munitions. I seem to remember reading, at the end of 1914, that Russian troops in the Carpathians were advancing to attack with merely a bomb in one hand and a bayonet in the other.

I cannot help feeling that there we had an opening which might have been infinitely more profitable than storming the German lines in France. Of course, it takes time to produce munitions, and for that matter it takes time to make soldiers. But a part of our energies could have been devoted to supplying munitions to Russia and helping her armies while they were still in a condition to fight; this we could not do until we opened the Straits and defeated Turkey.

I also suggest that we wasted a lot of our forces by sending out expeditions which had no definite aim. In the old wars many of the expeditions to which the Lecturer alluded had as a definite purpose the protection of trade or the development of new markets: new markets being very essential in those days. In the last war that was not done, and we wasted much effort on projects which were really unimportant at the time. Some we might have deferred until a later stage; others we might have postponed altogether. In any case, these problems should have been thought out beforehand.

There was an old British doctrine clearly laid down by Lord Hardwicke, to the effect that our great object in war should be to use our forces in theatres where they would be stronger than those of the enemy, where they could produce the greatest effect, where we would have least to lose but the enemy most, and where victory would achieve the most profitable result. Those fundamental ideas undoubtedly ran through the whole of the British war policy of the XVIIIth century; it was beginning to be felt at the end of the XVIIth century. That we did undertake an entirely new form of warfare in the last war is evident, and it cost us a great deal. Whether the Lecturer is right or wrong, the points to which he has drawn attention are certainly among those which need careful consideration when any reconstitution of our fighting forces is under discussion.

COLONEL F. ALSTON: I imagine that, originally, there was no intention to send out more than an expeditionary force of six divisions to France, and therefore Lord Kitchener's army was never envisaged. But what happened? Within the first few weeks the French plan of campaign collapsed; a large area of France was invaded; the Germans were coming on, and no one knew what was going to happen. Therefore, it seems, the political mind was forced, willy nilly, into putting "the whole body into the Flanders mud," as described by the Lecturer. This, I think, perhaps explains why we seemed to throw the whole of our weight into France and did not adopt the strategy outlined by the Lecturer.

COLONEL L. P. EVANS: The Lecturer has drawn an attractive picture of how the War might have been fought. But I think he rather overlooked one factor in modern warfare, and that is national armies. I think that the doctrine of concentration on victory, and quick victory, is due to vast national armies, and I wonder whether he has taken that sufficiently into account. If a country possesses a national army and starts to fight with it, it stakes the bulk of the manhood of the country; if it is beaten it is lost. These are not the armies with which Marlborough fought. The latter were, after all, but a small percentage of the nation—and replaceable. I suggest that it was fear which sent us—nation, politicians and soldiers—all into France. The Lecturer's whole plan would surely have gone to pieces if France had failed and the Channel ports had been lost. The submarine warfare would then have been a far greater menace. It seems to me, in fact, that there is a far stronger case than he gave us for the form of strategy which we did adopt.

AIR-COMMODORE W. F. MACNEECE FOSTER: I think everyone will agree with the Lecturer's retrospect; but the problem that interests us still further is its bearing on the 1914 campaign. It seems to be agreed that there were certain alternatives open to us at the beginning of the war in regard to the choice of theatres of operations; but where, I think, many will begin to disagree with the Lecturer is in his contention that, once we had made a great effort, it would have been possible for us to withdraw from that effort into more or less industrial work and embark on minor expeditions up the Danube or elsewhere. Surely we had to reckon with the state of feeling in this country, in France, and in Germany at the time; and then to consider what the effect of our withdrawal would have been. Had we withdrawn from France and concentrated on making munitions the impression in Britain would have been painful while France would have received little encouragement to carry on the war. I think the main reason why we were able to win the war was because the French did feel we were absolutely beside them to the last drop of blood, if it came to that, and were not occupied simply in making munitions.

I cannot help feeling that any other course which we might have taken would have been an unsound course, and might also have been considered a national dishonour.

MAJOR-GENERAL J. McM. WALTER: I wonder whether the Lecturer has considered, if we had gone on our old lines during the last war, what effect it would have had on the United States, and what they would have had to say. We all know that our blockade policy was not liked by them at all; I believe that relations at times were very very strained. Suppose we had adhered to our old traditional policy and, except for minor expeditions, remained in England while using our Navy for blockade purposes, and incidentally interfered with what the Americans would call their trade. We can guess what France would have thought, and our friends in America would probably have said: "the same old selfish policy; these Britishers sitting tight and grabbing colonies here and there, expanding their trade and interfering with ours." I think that might have led to trouble, and very bad trouble.

MAJOR G. I. THOMAS: I gather from the title of our lecture that economic pressure was preferred to continental victories because it ensured a quicker and more successful ending to the war. Although history was stated to prove this, is it in fact a fair deduction? There has been a great war practically every hundred years, and not one of these has ended quickly. This was because, previous

to 1914, we had combined economic pressure with subsidized allied armies, where frequent quarrels almost invariably produced a long chain of defeats before final victory came. We have to avoid a repetition of this process.

It seems that the alternative to the grand strategy of the last war suggested by the Lecturer depended primarily on the hope that the French would not have undertaken an offensive in 1914. The basis of Plan XVII, and all the reasons leading to its adoption by the French, are given fully in the French official history. The French were actually wrong in assuming the Germans would not come North of the Meuse, they underestimated by ten or more divisions the numbers the Germans would deploy on the Western Front, and nowhere did they rely on any help from our six divisions. Their plan has been severely criticised and we know it failed. Apparently the problem for the British Government, with an army of six divisions, was to teach strategy to the French with an army of one million.

THE CHAIRMAN:

While greatly impressed with the Lecturer's remarkable knowledge and deep study of his subject, I must say that I entirely disagree with him. I think his premises are wrong; I think that his reading of history is wrong. He has shown us only one side. I do not think that there is any particular antithesis between economic pressure and Continental victories. Economic pressure is the cause of war; it is not a substitute for military action. I deny entirely that in 1914 there was any departure from our traditional policy either in strategy or in tactics or in anything else. The only difference was to be found in the different armaments, larger forces, and means of mobility. The principles of strategy and tactics are and always have been the same from the days of Julius Caesar, and there was no departure from those principles during the war; we did resort to economic pressure to the utmost of our ability. To deny that is to ignore the wonderful part played by the Navy. Do not forget that economic pressure was exercised on every ocean all over the world. In this war, as in every other war, sea power has to be extended and completed with military power.

The Lecturer told us that our mistakes were due to imitation or to adopting the principles of Clausewitz; I do not agree. When Clausewitz taught the Germans to use the whole force of their nation, and to use it with as much impetuosity as they could, naturally we had to meet those tactics with similar ones. It was Colonel Evans who hit the nail on the head when he pointed out that the fundamental difference was that it was a war between whole nations in arms instead of being between small professional armies—armies of mercenaries in many cases, and that is why the whole thing was on a very much larger scale. When we are allied with a nation in arms and fighting against a nation in arms, how could we go with a small professional army like that in the days of Marlborough? We also had to constitute ourselves into a nation in arms, and I can go so far as to say this, and I have the right to say it, because for years and years before the war I was preaching it with Lord Roberts, that if we had constituted ourselves into a nation in arms before 1914 there would have been no war. It was the military weakness of England that was one of the causes of the war. I had that from the Kaiser himself some years before the war. When I told him I was trying to persuade my fellow countrymen to adopt universal military service, he said, "Quite right; that is the way to prevent war."

I do object to the mis-use of the word "conscription" among military men. We did not have conscription in 1915. When the war broke out we were the only

nation in the world that had conscription on our Statute book ; every other nation had adopted the more democratic, equitable, and effective system of universal military service. We preserved conscription in the Ballot Act, and it was not until that Act was repealed that we had universal military service. Conscription is a system under which citizens are enrolled by lot to serve in a professional army, and under which the rich purchase substitutes from among the poor. That is the only possible meaning of the word "conscription." The other system, the system which was adopted by every Continental nation before we adopted it, was the system of universal military service, which is democratic and fair. The Lecturer himself mis-used the word ; one of his strong points was that we ought not to have had conscription, by which he meant that we ought not to have had a national army. That, indeed, is where I profoundly disagree with him.

I cannot close without expressing my own opinion that the Lecturer minimised the part played by our Army, not only in France but wherever else it fought. I do not agree with that view, and I do not think that most soldiers will agree with it. The fact is that we were doing exactly the same thing as was done by our kings and generals in the days of Agincourt, the Marlborough campaigns, and the Peninsular campaign, but we were doing it with larger numbers of men.

The best way to learn is to hear the other side. We have heard to-day a very interesting view of that side, expounded by a man who has made a deep study of it.

THE LECTURER :

THE LECTURER, in reply, said : The first two speakers, representing naval opinion, seemed on the whole to be in agreement with me.

Captain Altham's point was that economic pressure may not nullify the need for military action. With that I entirely agree, and when he reads my lecture in full he will see that I sum it up thus :—" Our historic practice, as we have seen, was based on economic pressure exercised through sea power. This naval body had two arms : one financial, which embraced the subsidising and military provisioning of our allies ; the other military, which embraced sea-borne expeditions against the enemy's vulnerable extremities." I think that rather meets his point.

Admiral Richmond justly pointed out that modern credit gives far greater strength to countries against whom we try to apply economic pressure than it did in the past. That is undoubted. We cannot, unfortunately, apply the old method of cutting off treasure fleets ; but, on the other hand, I would suggest that the development of modern industrial civilization fully counterbalances that by making modern nations far more susceptible to economic pressure—especially nations that have to maintain national armies dependent on an immense supply of munitions, in contrast to the small armies of those earlier epochs.

I quite agree that some of our expeditions in the last war were wasted effort. It is difficult to justify the way and the scale on which the Mesopotamian campaign was conducted.

Turning to Colonel Alston's point, I agree that we should have sent our original expeditionary force either to France or to Belgium. That was probably necessary to meet the initial emergency. But subsequent action is another matter. The more one studies the records the more clear it is that Lord Kitchener and the Cabinet were most anxious to shift our forces elsewhere, but were prevented by the pressure of Joffre and the French staff, who unfortunately, in my view, were

supported by our General Staff in France. How far that was accounted for by the fact that, being there themselves, they were concerned with a limited horizon and were hindered from taking a wider view, I do not know.

Then, with regard to Colonel Evans' point. I would say that our immersion in France was due less to the pressure of events than to the grip of a doctrine which, with the idea of a quick victory, dates back to Clausewitz. Unfortunately, the events of 1870 grafted that belief, which proved to be an illusion, on the military minds of Europe; 1870 was, historically, an exceptional case. Not only was a "national" army pitted against a smaller army that was not "national," but against an army which was deficient and decrepit. The American Civil War would have been a better guide; but while no one in Europe except ourselves really studied the American Civil War, we were apt to think it was fought in the Shenandoah Valley, and thereby lost its great lessons. If we read the recorded words of any of our military leaders in the war, we see quite clearly a doctrine of war for which, personally, I can find no warrant in our past, or in the example of our past leaders, such as Cromwell, Marlborough, or Wellington.

Air-Commodore Macneece Foster raised the question of the state of feeling which would have arisen if we had not supported the French. Would he suggest—and is it now noticeable—that the French have been any more appreciative of our attitude than if we had adopted our traditional strategy? Looking at the pages of history, our past allies seem to have been neither less nor more grateful.

The same speaker also referred to the state of feeling in this country. That is certainly a point. We undoubtedly got the idea in the early days that we had to maintain a large military effort on a large scale in the main theatre. I feel that was because our responsible military leaders before the war had not impressed on the nation, and on military thought of the time, our history and our traditional doctrine; we lost sight of it. I think, also, that what Sir Henry Wilson had said tended to engender the idea in France that we should support her by a military effort on the Continent; that he gave them a much greater assurance of our participation and of our sharing in their strategy than was ever warranted. At the beginning of the war, when we did not instantly rush to their aid, there was extreme disappointment, especially among their military chiefs.

With regard to General Walter's remarks, I agree that if America had not been on our side we could not have tightened the blockade as much as we did in 1917. But when General Walter reads this lecture he will see that my argument is that we might have reinforced pressure from one side—from the sea—by all-round pressure and by tightening the ring round Germany. This, I think, would have been a counter-balancing factor. General Walter also spoke of the probable American attitude in the event of our strategy being guided by our own interests. I would suggest the Americans could hardly have grumbled at us for imitating themselves in a milder degree.

I come to Major Thomas, who pointed out that Plan XVII was developed before the war, and without reference to our participation. But the French did, actually, make some modifications in it; moreover, there were qualms felt in their Government circles and, to some extent, among their commanders with regard to it. I think if we had given them a definite indication of our action—that we should adhere to our traditional strategy—they would have been much more inclined to modify their plan. It was, again, Sir Henry Wilson who gave the French chiefs more assurance of our commitment than was justified.

I would finally refer to what the Chairman, who completely disagreed with me, has said. He suggested that the coming of national armies changed everything. But we have faced national armies before. A national army was opposed to us in the French Revolutionary and Napoleonic wars, where we applied our traditional strategy and where it succeeded.

As regards the outbreak of the war, I am much inclined to agree with him that if we had had, before the war, an army based on universal service, there is a high degree of probability that the Germans would have shrunk from the war. But that was debarred. Once we were in the war, unready—as always in the past and as, I fear, we always shall be—then the only grand strategy that could get us out of it with profit was our traditional strategy, proved by three centuries of application.

The customary votes of thanks to the Lecturer and to the Chairman, which were carried by acclamation.

THE SUBMARINE IN FUTURE WARFARE

A GERMAN VIEW

By CAPTAIN G. P. THOMSON, O.B.E., R.N.

GERMANY, with the size and composition of her Navy fixed by the Treaty of Versailles, has had no cause to attend the various naval conferences held since the War and thus publicly to express her views on the future of the submarine and its employment in war. A book entitled "Das Unterseeboot"¹ has, however, recently been published in that country, in which this subject is dealt with at some length by Admiral Bauer, who was in command of the German submarine flotillas for the first three years of the War. How far the views he expresses are representative of official German naval opinion it is not easy to judge, but in any event they are likely to have a considerable influence in Germany, if only because of the author's high rank and considerable war experience.

The chief interest and importance of the book for English readers lies in the Admiral's contention that the unrestricted employment of submarines against merchant ships cannot justifiably be forbidden by International Law, provided such operations are carried out in an area under blockade. The conduct of German submarines in the late War in attacking merchant ships without warning would, he maintains, never have given rise to the arguments and differences of opinion which exist to-day, had it been fully realized that a blockade is not commerce warfare, and had Germany but claimed for her submarines the freedom of action to which a declaration of blockade entitled them. Instead, she relied on the theory of reprisals to justify the manner in which her submarines were employed, and was thus obliged frequently to change her policy as a result of protests from neutral nations. It is of interest to note in this connection that Part IV of the London Naval Treaty, which was signed by the five leading naval Powers shortly before the publication of "Das Unterseeboot," lays down that submarines are to

¹ "The Submarine: Its Functions as Part of a Fleet—Its Position in International Law—Its Employment during the War—Its Future" (in German). By Admiral Bauer. (Verlag E. S. Mittler & Sohn, Berlin). R.M. 6.50.

conform to the same rules as surface vessels in their operations against merchant ships. In particular, it prohibits a warship, whether surface vessel or submarine, from sinking a merchant vessel, unless she refuses to stop or actively resists visit and search, without first placing her crew and ship's papers in a place of safety, and further stipulates that the ship's boats, unless near land under good weather conditions, are not to be regarded as such a place of safety. Admiral Bauer points out that this entails submarines having a co-operating surface ship, for whose safety the Treaty makes no provision, and consequently confines submarine operations against trade to the high seas, where there is unlikely to be a concentration of enemy anti-submarine measures. But he clearly implies that the Treaty is of little importance because it can only be legislating for commerce warfare when submarines are used as cruisers in the search for contraband, and cannot in any way affect the legal right of a warship to prevent blockade running by the most effective means open to her. Indeed, one of the principal objects of his book is to prove that the submarine will achieve little in "contraband warfare," and that her main value lies in her employment as a blockading vessel off the coast of an enemy in control of the sea communications.

To understand this German view, it is essential at the outset to be clear as to the difference between "blockade" and "contraband." The object of blockade is to cut off all intercourse with a specific place; no matter what her nationality or what kind of cargo she is carrying, a ship has no legal right to proceed to a besieged or blockaded port. The purpose of contraband, on the other hand, is to cut off from the enemy articles of direct use to him in prosecuting the war, and a belligerent is authorized to seize such articles if found on the high seas, no matter what may be the nationality of the vessel carrying them. Other goods, however, are immune unless they belong to the enemy and are carried in enemy vessels. Thus, the search for contraband entails visit and examination before vessels can be seized, whereas in a blockaded area such procedure is unnecessary, for they have no business to be there at all. To seize a vessel is, however, a different matter to sinking her at sight, and it seems doubtful whether world opinion generally will consent to the infliction of so drastic a penalty on a neutral blockade runner. On the other hand, the Admiral maintains there is no question here of interfering with the rights of neutrals. Assuming that submarines are able to carry out effectively the operation of blockade and that the question of humanity can be set aside—both these points are dealt with in the book at considerable length—it is merely a matter of the penalty to be imposed on an enemy or neutral merchant vessel which deliberately interferes with the military operations of a belligerent by attempting to hold intercourse with a blockaded area.

That neutrals will consider they have a right to trade with either belligerent is not denied, but it is argued that this point has little force at the present day in view of the change in the character of war from a war of armies to a war of nations. Practically the whole of the trade going to an enemy country is tainted with the character of contraband, as it is supplying him with the means of carrying on the war. Great Britain, the author contends, formulated this view in her note to the United States of 24th April, 1916. On the other hand, it is alleged, a blockading Power must do everything possible to protect genuine neutral trade serving the neutrals themselves: such as timely announcement of the blockade, restriction of operations to the area blockaded, keeping previously determined routes open, etc. It may even be desirable to arrange for safe communication between the enemy and neutrals, as was suggested by Germany to the United States. Above all, continues the Admiral, care must be taken to refrain from blockading neutral coasts, as was done by Great Britain in the War, though under another name, on the ground that modern conditions necessitated her intercepting forces remaining a long distance away from the enemy coast; for the inclusion of a neutral coast in the blockaded area is simply to bring the neutral into the service of the belligerent. But as regards the real point under discussion, the trade of neutrals with a belligerent, it is universally recognized that this trade is bound to suffer, as it always has done in war. It is for neutrals to decide whether they are to accept such injuries as a price for gain, whether they are to protest, or finally, whether they are to come into the war. In brief, the only restrictions necessary in a blockade are dependent on the political situation, on the degree of necessity for the type of blockade contemplated, and lastly, on the question of might.

Dealing with the ability of submarines to carry out an effective blockade—for a blockade to have legal force must be effective—the author reminds us that one of the principal objects of the Declaration of Paris (1856) was to bring some order into matters relating to Prize Law, which were still at that time in a chaotic state. There had been in the past fictitious or paper blockades which were declared but not carried out, and then subsequently made to apply to ships and cargoes all over the world on the mere assumption that these were destined for the blockaded coast, either by direct or indirect route. The Declaration of Paris defined a blockade as the actual investment of a port or coast, carried out continuously and solely by the forces stationed off the enemy's coast for this specific and often dangerous duty. But in going on to say that a blockade, to be binding, must be maintained by a force sufficient really to prevent access to the coast, the Paris Declaration was asking something which it is wholly impracticable to carry out, and

which must make the blockade legally unworkable. We are referred, as a case in point, to the blockade of the Southern by the Northern States in the American Civil War in 1861. To blockade a coast three thousand miles long there were only seventy ships available at the beginning. The number of blockading ships totalled six hundred and seventy before the war ended, yet a complete blockade was never achieved. On the other hand, all the signatories to the Declaration of Paris recognized this blockade as legally binding. The operations of American ships off the British coast in the war of 1812 are next cited as affording an almost exact parallel to the German submarine blockade, and as an illustration of the fact that the conduct of a blockade depends on the war situation and technical developments at the time, thus rendering abortive any attempt at permanent regulations on the subject. The American privateers conducted their campaign in much the same way as the U-boats in the late War, and were likewise found operating off the English coasts. Captain Thomas Boyle, of the privateer "Chasseur," even forwarded to Lloyds a declaration that the whole British coast was blockaded. The Americans armed 515 privateers and captured 1,345 English ships, a considerable number of which were destroyed.

The author sums up his arguments on this question of effectiveness with the assertion that a fair and practicable definition of an effectively blockaded area is an area through which no vessel could pass without danger. And this danger would naturally be greater in the case of a blockade by submarines, in view of the ignorance of the blockade runner as to their positions when submerged. Germany, in the World War, had sufficient submarines in 1915 to carry out a blockade as effective as that carried out at the commencement of the American Civil War, but in 1916 and still more in 1917 a much more effective blockade became practicable. The right time for declaring a blockade would, it is alleged, have been in 1915, or at the latest in the beginning of 1916, when the amount of shipping sunk was three or four times more than in 1917, in spite of the restricted warfare in those earlier years. By the autumn of 1917 England had had time to perfect her anti-submarine measures, including the convoy system, which was the primary cause of the defeat of the submarine blockade.

Discussing the methods of defeating the convoy system in future blockades, Admiral Bauer begins by suggesting that an enemy will not willingly resort to it in view of the great reduction in shipping space entailed, and that if he does, convoys can be defeated by concentrations of submarines. In the late war, submarine cruisers were sent away on comparatively fruitless oversea expeditions lasting several months,

instead of being detailed, as they should have been, to watch the ports of assembly. They could then have kept touch with the convoy both on its outward and return journeys, and have broadcast information of its movements and thus enabled concentrations of submarines to assemble for massed attacks on it. This will be done in future wars in accordance with carefully organized plans, since it is the only way to defeat the convoy system. In order to eliminate effective aircraft reconnaissance it will be necessary to extend the area under blockade as far as the night steaming radius of steamers. It is true that in the last War the numbers of U-boats available for concentration were certainly small, but they would have been considerably greater had the blockade been foreseen and prepared in accordance with a properly thought-out plan. Actually, in spite of Russia's collapse, from five to eight submarines were employed in the Baltic until the end of 1917, whilst four submarines remained based at Constantinople. Better organization would have enabled at least thirty submarines to have been employed simultaneously off the English coasts, and this number, subject to suitable reconnaissance, would have rendered possible the massed attack.

The fact that in future wars nations will be better prepared for the submarine is admitted, but against this it is argued that no country can afford to have available at the beginning of a war the large number of anti-submarine craft required—craft which must have the highest possible speed if the ram and depth charge are to be successfully used. To that extent the surprise value of the submarine will still remain.

Lastly, the submarine blockade is discussed from the point of view of humanity. The sinking of a ship without warning in a blockaded area is not something new since the appearance of the submarine. It is, says the Admiral, the positive duty of the officer in charge of a blockade to employ all conceivable means to keep traffic away—be they ships, aircraft, mines, blockships, or the destruction of the harbour facilities by bombardment. So why not submarines? The besieger of a fortress which is also a seaport installs coastal batteries and fires at every ship approaching or leaving without any objections being raised. He may, it is true, signal the ship to stop as a matter of form, but he will in any event fire at her before she escapes him. In the American Civil War, blockade runners were simply fired at by the warships of the Northern States without any anxiety as to the safety of the crews—not, it is true, with torpedoes, since these did not exist, but with guns. There was no thought of stopping, no search, no question of nationality or the nature of the ship's cargo or her owners. The decisive fact was that she was a blockade runner, and nobody thought of objecting. Again, the destruction of a ship in a blockaded area by a mine is just the same in effect

as if she had been sunk by torpedo, and yet the former has never been objected to. In other words, a submarine may dive ahead of a steamer, lay a mine and allow the steamer to hit it, but she should not sink her by torpedo! Attempts of this nature to restrict submarine operations are unnatural, and lead to consequences inconsistent with the conduct of war.

Dealing with the moral side of the humanity question, Admiral Bauer asks who is to fix the limits which inhumanity is not to exceed, since war by its nature is inhuman. The charge of inhumanity was merely propaganda successfully used by the Allies to influence the masses who have no judgment. The unfairness of the outcry when the "Lusitania" was torpedoed—a piece of luck for the Allies, he thinks—is evident from the fact that almost exactly at the time this vessel was sunk a British submarine sank the Turkish liner "Stambul" with seven hundred passengers in the Sea of Marmora without any notice being taken of the incident.¹ Furthermore, continues the Admiral, whilst it is true that about thirty thousand persons lost their lives through the U-boat war—persons who, in spite of warning were in a blockaded area because of money to be gained or business to be done—there is the proved fact that eight hundred thousand non-combatants died of starvation in Germany owing to the British blockade; surely a striking refutation of the charge of excessive inhumanity, even if the cruelty of your opponent cannot be pleaded as a justification of your own conduct.

In conclusion the views of Winston Churchill, Sir Percy Scott, Lord Fisher, and even of the R.U.S.I.,² in addition to various French authorities, are quoted in support of the plea that the German submarines were justified in sinking merchant ships without warning. In his somewhat lengthy examination of the whole question of submarine operations against merchant ships, Admiral Bauer maintains that no really important results can be expected from what he calls "genuine commerce warfare." The vulnerability of the submarine on the surface, the impracticability of her carrying out visit and search with security, and of providing for the safety of the merchant ships' crews are all factors working against her. This type of warfare must be relegated to sub-

¹ There is no resemblance between the attacks on the "Lusitania" and the "Stambul." The former was in the open sea and obviously carrying passengers. The Turkish ship was in harbour and obviously being used for military service. It is untrue that there were passengers on board her.—EDITOR.

² The reference here is to the award of a prize in 1919 to Lieutenant C. M. Faure, R.N., for his essay on "The Influence of the Submarine in Naval Warfare in the Future" in the R.U.S.I. JOURNAL, upholding the German submarine campaign.

marine cruisers operating in distant waters and possibly to two submarines working together, the one submerged and standing by to fire torpedoes at the slightest sign of hostile action, whilst the second remains on the surface and carries out the normal procedure.

International Law as now framed, he continues, is most unfair to the submarine—the only craft which can operate in areas commanded by the enemy. Why should the defensively armed merchant ship, armed as she was in the World War with the definite object of resisting the submarine, retain her merchant ship character and not be torpedoed without warning? And why should a submarine merchant vessel, such as the "Deutschland," which was definitely certified by the U.S.A. to be a merchant ship, be deprived of the protection claimed by the surface merchant ship? Indeed, the more thoroughly the problem is investigated, the more apparent does it become that there is only one logical solution to all these difficulties: not to claim a special privilege for the submarine, which is a warship in every sense of the word, but differentiate between submarine operations in cruiser warfare and in blockade, bearing in mind that International Law places no limit to the extent of an enemy's coast which may be blockaded.

In an interesting chapter on the value of the submarine as compared with the surface ship, Admiral Bauer considers that warships, well escorted and steering a zig-zag course at high speed, will always be more than a match for the submarine because of her low submerged speed and small range of vision. Fleets know how to protect themselves nowadays, and submarines are unlikely ever again to achieve the success of the U-boats in the early days of the War, when they drove the British fleet out of the North Sea. The submarine can act as an auxiliary, but can never replace the surface ship in the task of gaining control of sea communications; and this is equally true when considering the exercise of that control, for if the submarine can deny the sea routes to an enemy, she cannot secure the safety of her own traffic. It is only as the opponent of an enemy already in command of the sea that the submarine really comes into her own.

When discussing the operations of submarines acting as auxiliaries to the fleet, the Admiral points out that the stationing of submarines singly on patrol is a waste of effort. A patrol line of several submarines advancing across a definite area, as employed by the Germans on the 6th and 12th August, 1914, has the disadvantage that the line is apt to become broken owing to lack of inter-communication, navigational inaccuracies and unexpected dives, whilst only one submarine normally has a chance to attack. A better method is to have two lines of reduced width, the submarines in the second line having thus a chance

to concentrate for attack. The best plan of all, however, is to station submarines on the circumference of a circle, the whole circle advancing over the area to be searched. This method was adopted after the battle of Jutland but with no organized plan behind it, and consequently no success was achieved. Real or feigned movements of our own fleet must always be timed to coincide exactly with the institution of these sweeps.

Regarding the actual co-operation of submarines with the fleet in battle, Admiral Bauer favours tactical rather than strategical employment, to ensure that they will make contact. They should be so disposed round their own battle fleet that when the enemy fleet is sighted they have only to spread and dive to attack. It is useless to expect them, after the enemy is located, to move out to the necessarily advanced attacking position between two fleets approaching at high speed; even if they had the speed to arrive there in time, the enemy would sight them and avoid that particular area. They should be stationed in groups round the fleet at a distance of twenty miles from their battlefleet to allow for deployment range and to achieve surprise. Thus, three groups stationed one ahead and one on either beam, would cover an arc of sixty-five miles and be thirty miles apart. An alternative method would be to keep them close to the battlefleet until the bearing of the enemy became known, when they could be sent off to intercept him, their own fleet at the same time turning directly away from the enemy. Against this plan it must be borne in mind that cruiser engagements often dictate the course of the main fleet battle, and that an enemy will not necessarily follow a retiring fleet in the known presence of submarines and mines.

Coming to his final chapter in which he discusses future developments, the Admiral rules out the possibility of the destroyer and the submarine merging into one type on the ground that the latter would require to sacrifice essential submarine characteristics to obtain the speed required of the destroyer. Sea Powers, however, who do not intend using their submarines against merchant ships, will build submarines with a speed superior to that of heavy ships to provide a margin for tactical co-operation.

As regards types, the London Naval Treaty indicates that, in the near future at any rate, only submarines and submarine cruisers, more or less of the same size as existed in the War, will have to be reckoned with. Submarine cruisers, it must be remembered, are not genuine submarines, for they use their power of submersion mainly to pass through dangerous areas, and attack with the gun. Besides their function as reconnaissance vessels in the blockade, they will be required

for commerce warfare in distant waters. Light armour plating is, therefore, essential to keep off shell splinters and thus prevent a loss of fuel or, worse still, a tell-tale oil track behind them on diving.

In conclusion Admiral Bauer once again emphasizes the essential difference between commerce warfare on the high seas and a blockade of an enemy's coasts, and maintains that the blockade will be carried out with increasing severity in future wars because nations are becoming more and more dependent on oversea trade. The path of peace, he continues, is not smoothed by forbidding a country like Germany to have submarines whilst all other Powers are building them with the greatest energy. The German people know how much they owe to their submarines and what a fine set of men fought and died in them. They will not for long allow themselves to be deprived by force of this weapon which they have grown to love.

THE FOUNDATIONS OF THE INDIAN ARMY

By COLONEL E. B. MAUNSELL, *p.s.c.*, late the 14th P.W.O. Scinde Horse.

IN order to appreciate at their true value the characteristics of the Indian Army of to-day it is necessary to gain some preliminary insight into its past history. It is only by bearing in mind the historical development of the Indian Army that we can judge correctly its strength and its weakness at the present date.

The army of the Honourable East India Company took its beginning from three separate nuclei, separated by many miles of road and sea and hostile territory. These three centres were, firstly, "an ensign and thirty men," reinforced by "a gunner and his crew," stationed in Bengal towards the end of the XVIIth century; secondly, a detachment sent to garrison Bombay, the dower of Catherine of Braganza, Charles II's bride; and, thirdly, the enrolment of soldiers from among factory door-keepers and watchmen and their formation into companies in Madras. These haphazard beginnings were the unpremeditated foundations of three great armies.

The raising of native regiments proper was first undertaken by the French, and to the struggle for mastery in Southern India do we owe the first conception of a regular native army. But even then the distances separating the three Presidencies resulted in their respective forces growing up on divergent lines and with different organizations, of which the evil results lasted until after Kitchener had abolished the Presidential system.

The European soldiery raised and maintained by the Company, as distinct from the King's troops, had been formed from detachments sent out from England, disbanded French soldiers, runaway sailors, Germans and, indeed, any white man in search of a livelihood. It was an accepted practice to allow a man to enrol for service in the East Indies in lieu of Newgate or transportation. Included in their number, however, was a small percentage of men of education who deliberately enlisted in order to rise from the ruck by merit. When blessed with the combination of a strong arm and good health they usually succeeded; prominent among such was Sir John Horsford, Lake's Artillery commander. The class of man improved slightly in the XIXth century

owing to a large number of "turnovers" found from among the King's, or Queen's, troops when these regiments were ordered home. No difficulty was experienced in obtaining such "turnovers," for service in India was extremely popular among the rank and file. Indeed, if the conditions prevalent in India be compared with those obtaining at home or in the Colonies, the men were extremely comfortably off, well fed, relatively well housed, and waited on hand and foot. Of low class though the Company's European troops mostly were, none the less Wellington in 1804 tells us that, as a fighting man, the equal of the British soldier, as he was then found in India, did not exist throughout Europe. Blakiston confirms this opinion when he states that the British soldiery he knew in India were "immeasurably the superior" of any he found in Spain.

The first Royal troops to serve in India were the 39th Foot, being then commanded by one Adlercron, an individual described by Wolfe as "a very little, insignificant officer," who persistently thwarted the Company's officials, until, eventually, the 39th started on the Plassey campaign as marines. This step was taken so that the King's troops might avoid the taint of serving under a Company's officer. Adlercron, however, did not accompany the expedition, or Clive might never have fought that battle. Nevertheless the friction engendered by Adlercron lasted, and was enhanced by the harsh conditions of service of the Company's officers. Much jealousy and bad blood existed between the two services until 1796, when Cornwallis introduced reforms in the whole army of the Company, many of which are applicable to the present day.¹

In addition to the native troops from Bombay and Madras that fought at Plassey there was another body, upon which the whole of the present day native infantry battalions have been modelled. This was the famous *Lal Paltan*, or "red regiment." The Bombay and Madras sepoy of that period, though disciplined after a fashion, were armed and equipped in native style. Clive resolved to try the experiment of assimilating a native corps to the European model as nearly as possible. Having raised some three or four hundred picked men, he furnished them, not merely with arms, but with uniforms of British pattern, and drilled and disciplined them with British officers and sergeants just as regular troops. The experiment was a great success. Excellent recruits of every martial race in Northern India, including Pathans from

¹ A point worthy of note is that Plassey, the victory which laid the foundation of British rule in India, was won by a combination of King's and Company's European troops, sailors and native troops from all three Presidencies—including far-off Bombay—augury of the virtues of combination.

Peshawar, Rohillas and Jats came forward. The battalion had a brilliant record; it showed the British soldier how to fight in the third assault at Bhurtpore in 1805, when the white troops refused to quit the trenches. Sad to relate, the battalion came to grief in the Mutiny, and, worse still, it was one of the corps that took part in the horrible massacre at the burning ghat at Cawnpore. Within the next few years after Plassey every Presidency proceeded to raise corps modelled on this famous body.

But the most important reforms were those effected by Cornwallis in 1796, which brought the conditions of service among both British and native ranks to a reasonable similarity in all three Presidencies, and consolidated the native corps. Cornwallis it was who recommended that the Crown, or its present equivalent the War Office, should assume entire control of the armies, including native corps, an event which many Indian Army officers heartily prayed might come to pass in the Great War. The conditions of service then applied to British officers continued in force until the abolition of the Company. Very many of these conditions still apply to native troops. The new regulations granted officers furlough for three years on full pay, introduced pensions and made the Company's officers rank with the King's.

Until some years after the end of the Company, the Army in India was subdivided on what would now appear an extraordinary plan. There were three distinct army administrations: namely, Madras, Bengal and Bombay. The troops in each of these were raised under different terms of service and conditions of pay. In the days of slow communications the system undoubtedly had its advantages, but these came to an end with the construction of railways and telegraphs. The subdivision then became a waste of power, which persisted until Kitchener abolished the Presidential system. The Company's Board of Directors in London maintained a general control, and in major respects, that is after 1796, the armies did not materially differ in organization, equipment and dress. None the less, they were distinct, and no small amount of jealousy existed among them: indeed among the native rank and file there was often hostility, for the men differed from each other in greater measure than a Greek from a Prussian. In addition, there were the Royal troops, as distinct from the troops of the Honourable Company. The Royal (King's or Queen's) troops comprised British infantry and cavalry only, together with certain foreign corps such as the Swiss Regiment de Meuron and Hanoverians specially recruited for the East Indies. The Royal Artillery only served in India temporarily during the Mysore wars, since the Company had its own artillery, of which the greater portion consisted of native personnel.

In addition, there were the Company's European troops, recruited for service in the East only, and, therefore, a localized service. They consisted of infantry and artillery, for no cavalry existed until after the Mutiny, when a collection of street sweepings nicknamed "Dumpies" came into being. The whole of the native troops belonged to the Company.

The term "staff" in India comprised the staff proper, then only the Quartermaster-General's and Adjutant-General's branches, together with what are now known as Departments, such as the Commissariat, Medical and Ordnance. Taken as a whole, the staff proper appears to have been both unpopular and inefficient. "Once on the staff always on the staff" was a common proverb, and a very true one, with the result that staff officers lost touch with the inner feelings of both officers and men, deeming themselves a superior caste and making themselves not merely unpleasant but often offensive. The mutiny of Madras sepoy at Vellore in 1807 was traceable, in large measure, to foolish orders brought in by incompetent staff officers regarding caste marks and a pattern of turban to be worn. The persistent interference with commanding officers of the Bengal army in the thirty years preceding the Mutiny had much to do with the general weakening of discipline that led thereto.

Turning now to the officers. The King's and Company's officers were drawn from the same social strata as they always have been, namely the younger sons of the country gentry and corresponding classes. Wealthy officers were unknown in the Company's and, in India, hardly to be found in the King's service. On the authority of Fortescue, Lord Wolesley and many others, it may be asserted that the Company's officers were, professionally and mentally, considerably ahead of the King's, since they had infinitely greater scope and responsibility. This fact, however, was largely discounted in the senior ranks by the slowness of promotion, which was conducted on a rigid system of seniority. Consequently they were too old.¹ Indian military history teems with instances of pusillanimity and loss of nerve on the part of senior officers who had spent long years in India—King's officers are included in this category—but who had, in their younger days, shown themselves full of energy. In the King's service promotion, except in the artillery and engineers, was by purchase, and many men obtained command who were unfit for their position. On the other hand,

¹ The extreme age of the senior Company's officers can be gauged by a visit to St. Mary's Church, Madras, where there are memorials to officers over seventy "in command of the garrison." At Saugor there is another memorial to an officer of eighty, also in command.

positions of responsibility were reached when officers were still young and virile, and, such officers often being men of some means, were enabled to travel and enlarge their minds to an extent impossible with their poorer comrades. On the whole, therefore, the King's officers, in the senior ranks, were of more value than those of the Company.

Although many of us are given to suppose that there has been a great change in the characteristics of British officers in the past century, on reading deeper into the matter, particularly when we study Blakiston and Pester, who served under Wellesley and Lake respectively, we see how astonishingly little change can be detected. We see the same humour, the same love of sport, the same appreciation of what we term "a good fellow" and the same reprobation of his opposite. Both our authorities were shrewd and able soldiers, and both testify that, in India at all events, "there was very great zeal for the service." Their accounts of soldiering in India over a century ago shows how little things have altered in fundamental characteristics. The British rank and file were rougher than they are now, but the old Atkins shows himself, beneath the surface, in very much the same manner. Nevertheless, there is a change among the native soldiery, chiefly because the present day native soldier differs racially from his forebears to a degree we scarcely realize. It is the racial characteristics that remain constant, and these will reveal themselves when the veneer of civilization is removed in moments of grave stress or in war.

The old armies of India reached their zenith in the years 1803-06, steadily declining thereafter. The reasons are not far to seek. There had been a constant state of war in Southern India during the last twenty years of the XVIIIth century. Troops from all three Presidencies had taken part therein, although the operations had mainly affected the Madras and Bombay armies. The fighting had been of a type admirably suited to improve the morale of the men in that it was not sufficiently bitter to demoralize them, whilst sufficiently strenuous to weed out the weaklings, European and native, who invariably accumulate in India during long periods of peace. The native units enjoyed for purposes of war, the enormous advantage of a strong cadre of British officers with some additional British N.C.Os. For instance, the 1/2nd Bengal Native Infantry marched out of Shikohabad in August, 1803, with eighteen officers and two N.C.Os, all British. In periods of peace this number has the disadvantage that the native officers have but little or nothing to do. Prior to the Mutiny, however, the native officers were, in general, mere cyphers, and did nothing. In 1803, and for some years later, there was no great call on officers for extra-regimental employ as was the case in the years just preceding the Mutiny, and corps were not bled of their best men for this purpose.

The chief reason for this high standard, however, was the great power vested in the commanding and all British officers. The former were petty kings, possessing great powers for reward and punishment, while the latter exercised considerable authority, being able to award a man a few strokes of the rattan for minor offences. This punishment was awarded in a formal manner and carried out by the native officers. In Lake's army, although naturally there were certain failures, the majority of officers were excellent. The commanding officers seemingly averaged about twenty-seven years' service, and would thus be about forty-three or forty-four years of age. The virility of certain senior officers, some of whom had been continuously in India for close on thirty years, must have been extraordinary. The failures, unfortunately, could not be removed from the service, for the Board of Directors was astonishingly lenient on this point. The result was that they were allowed to remain, taking the next steps for promotion in accordance with the fatuous system of seniority. Marley, a major-general of the Gurkha War, who so lost his nerve that he deserted from his command, actually rose to be a lieutenant-general.

This pernicious system of promotion by rigid seniority had not come into being among the native ranks, but was eventually adopted *in toto* by the Bengal Army, largely by that of Madras, but not by that of Bombay. Edwardes, himself a Bengal officer, writing of the siege of Multan in 1848, comments on the enormous superiority in discipline, turn-out and steadiness of the Bombay troops over those of Bengal, owing to the system of promotion by selection, in addition to their more up-to-date equipment, water bottles and haversacks, which the Bengal troops lacked. Much the same comment had been passed by a Bengal officer at Bhurtore in 1805, when the Bengal *bahadurs* turned out to watch the *unta gurgurs*, or "camel gurgles," march in, hoping to patronize them, as Bengal always did. In size and appearance the Bengal troops had the advantage, for the Bombay men, including the hard, virile Mahratta, do not catch the eye. Generally speaking, indeed, the Bombay soldiery were even more insignificant-looking than those of Madras.

In 1827, however, a puerile humanitarian, in the shape of Lord William Bentinck, set to work. An order was issued limiting flogging and suppressing punishment by rattan: this applied to all Presidencies. That step was followed up by another order, in 1835, which abolished flogging altogether in the native army, although the punishment remained in existence for the British. Adequate substitutes were not provided, and, in 1840, an old native officer who had served under Lake contrasted the state of discipline prevailing in the words, *Fauj be dur hogya*,

or "the army has ceased to fear." The power of commanding officers, both for punishment and for reward, became more and more curtailed, until, incredible though it may appear, a colonel was not able to promote a good man in the Bengal army out of his turn. The result was that the senior native ranks became full of senile old men unfit for their positions. On a cross standing over a long trench grave at Chillianwalla can be seen the names of two Brahmin native officers, aged seventy and seventy-two respectively, killed in battle.

The abolition of flogging would appear to have affected mainly the Bengal Army, whose men, nearly all high caste Hindus and Rajputs of Oudh, already suffered from swelled heads. This tendency was enhanced by the persistent pandering to caste prejudices on the part of their officers, and the attention paid by the staffs to innumerable complaints lodged by the men against their superiors.

The Bengal sepoys, indeed, appear to have been encouraged to address complaints to higher authority, and colonels found themselves snubbed on their very parades. None the less, the relationship between officers and men was good, and there is not the slightest doubt but that the vast majority of Bengal sepoys had no desire to mutiny, but were swept away by their leaders. Had this relationship been bad, difficulty would have been experienced in obtaining recruits, whereas numbers of excellent men came forward, and the manner in which the sepoys supported their white officers, under most trying circumstances, in Afghanistan is proof of the good feeling then existing. The fiery Nott with Bengal sepoys and the 40th Foot, as his only British corps at Kandahar, abundantly showed that, although the army was now well on its decline, when ably handled by a strong commander, who understood the men, its fighting value was great—even in 1840. On the other hand, John Jacob, then serving at Jacobabad and in the vicinity of the Bolan Pass, drew attention to the utter absence of discipline among the Bengal sepoys in Sind, stating that in them lay the greatest danger to our rule in the East. A little later Sir Charles Napier stated as much, and both officers were well snubbed for their pains. Jacob in his letters had contrasted the Bengal with the Bombay sepoys, very much to the advantage of the latter. Bengal being a favoured province, this representation, though perfectly accurate, was regarded as tantamount to blasphemy.

In the meantime, the Madras Army had fought its last great battle at Mehidpore in 1817. It then went to sleep, awakening, in a small measure, for wars in Burma, but was not properly roused until the Mutiny, in the suppression of which it played its part well. No part of the Madras Army, though it included in its ranks a large number of

Pandy sepoy by race, gave trouble, for it still retained its discipline. Its personnel, like that of Bombay, was very mixed. No great combination of men racially almost identical, such as existed in Bengal, was there possible. Furthermore, there had been no pampering in this army for the Madras officer, in the days of Wellesley at all events, enjoyed the reputation of being rather a slave-driver than otherwise, much war having taught him that the only manner in which the Indian soldier can be kept efficient is to work him continually and never allow old men to accumulate in the ranks. The Bombay Army, in like manner, retained its efficiency, though a small proportion of Pandies gave trouble at the outset of the Mutiny. The Bombay troops took a very important share in its suppression, and Pandies fought in the ranks with the rest.

The conquest of Sind in 1843 was effected almost entirely with Bombay troops. But, in the subsequent garrisoning, grave indications of trouble appeared among units from Bengal detailed for that service, and two years later Lord Hardinge repealed Bentinck's "no flogging" order. It was too late. Discipline had rotted, the senior British officers were all old men, whose virility had been sapped by the climate. The ranks were full of useless men who should have been sent on pension some years before. Only in rare instances is a sepoy fit for much fighting after fifteen years' service. Yet here men were kept on till they had completed a full twenty-five years. In the subsequent heavy fighting of the Sikh Wars the British soldiery, with a few honourable exceptions among the sepoy, did all the work, the native troops frequently bolting en masse. In forty years the Poorbiah, who under Lake, had stood up to 20 per cent. and even 40 per cent. casualties, and even then retained his moral, had sunk to being incapable of suffering even 5 per cent. The Bengal Army was useless, and known by many of the higher authorities, such as Sir Henry Lawrence, to be dangerous, yet nothing was done. Eight years after Chillianwalla the explosion occurred.

In the pre-Mutiny armies of India, the different races recruited stood in the ranks cheek by jowl, Hindu and Mussulman, Mahratta and Poorbiah; the present racial distribution into complete watertight compartments did not obtain. The upshot was that when the Mutiny occurred, the minority, who had no desire to join the rest, were isolated and swept in with the majority. The whole essence of the modern army system is based on the old Roman principle, *divide et impera*: a very wise maxim it is, too. While the Bombay and Madras armies remained in this respect much what they had been in 1805 until the 'eighties, that of Bengal was reformed after the Mutiny. The two

former had demanded the best fighting material, regardless of caste; in them men of high caste stood side by side with men of lower castes, and were compelled to work as others did. In Bengal, on the other hand, the whole pre-Mutiny army was composed of men of almost the same race, while caste was regarded as a *sine qua non*. The officers pandered to the men; so, after Chillianwalla, we find the extraordinary spectacle of the British soldiery sweating at the trenches, with the Bengal sepoy, too saintly to dig, after he had shown singular reluctance to fight, standing by watching the "gora log" doing the coolie work.

At the end of the Mutiny, only fifteen out of seventy battalions of the Bengal line and none of the regular cavalry remained in existence. On the occasion of the transfer of India from the Company to the Crown, there stood, at the end of a long line of troops on parade at Peshawar, in its scarlet coatees, black shakoes and white cross belts, the one surviving battalion out of many that had escaped mutiny. The influence and character of its officers must, indeed, have been great. On its right, however, was a long line of khaki-clad soldiery, the new levies from the Punjab and Frontier which had replaced the Poorbiah corps as the racial material of most of the modern Indian Army.

The post-Mutiny reforms may be summed up as follows:—

- (i) The abolition of a localized European force in the shape of the Company's European troops. The existing relics of this are the amalgamated 19th/20th Hussars and 21st Lancers; these are the former "Dumpies"; the 2nd K.O.Y.L.I., formerly the Madras Light Infantry, 2nd Durham L. I. (formerly the 106th) and 2nd R. Sussex (formerly the 107th) and sundry batteries of artillery. The remaining Company's infantry, converted into South Irish corps, disappeared on the founding of the Free State. This transfer from Company to Crown led to the so-called "White Mutiny."
- (ii) The substitution of irregular (silladar) for regular cavalry in the Bengal and Bombay Presidencies, the regular units of Bengal being disbanded, but those of Bombay converted. The Madras cavalry remained regular.
- (iii) A great reduction in the number of British officers in all corps, which resulted in an increase of their prestige and importance, while the native officers commenced to do a little work. This change did not affect the Bombay and Madras armies for a few years.
- (iv) A reduction in the native artillery. The fact was that the native, as always, had shown himself to be an inconveniently formidable gunner.

- (v) A most important reform ; the recruitment of different races in different battalions or companies on the principle of " Divide and Rule." How many Indian Army officers have not blessed this reform ; This measure, again, only affected the Madras and Bombay armies later.
- (vi) The greatest reform of all : a restoration of the powers of commanding officers to very much what they were in the days of Lake. The strain of the Great War has shown that these are adequate and not abused.
- (vii) The seniority system among officers was retained, and has proved satisfactory, though, as before, the Army has often suffered from senior officers of too great age. This drawback, however, is in no way to be compared with the state of affairs existing before the Mutiny.
- (viii) A great increase in the number of British, and a reduction in the number of native, troops. In Bengal alone, there existed, in 1857, no fewer than 137,000 regular native troops, only some 30,000 short of the total present day native army in India. The Europeans numbered 39,000 in the whole continent, whereas there are now close on double that number.

Reforms in the years subsequent to the Mutiny were primarily directed to recruitment of races deemed more capable of withstanding the hard life on the Frontier. This was particularly the case after the Second Afghan War, when a craze for recruitment from the Punjab set in. This lasted until the Great War proved that good fighting stock existed in other parts of India, and that, provided the troops were properly fed and clothed, they were as efficient as most from the Punjab.

The Great War revealed many grave weaknesses in the Indian Army, apart from the training which had lagged behind that of the British Service at home. The administrative branches, notably the Supply, Ordnance and Medical Services, proved hopelessly insufficient, while administration in general was still based on the huckstering spirit of John Company. The pre-war custom was for the sepoy to feed himself in time of peace, with the result that the Supply Service proved utterly inadequate for major operations. The organization, by races, for reinforcing units on service was equally inadequate, while in the case of Indian units, the reinforcement of a unit with men racially other than those regularly enlisted is likely to lead to grave difficulties. The transport service would, possibly, have sufficed for small wars, but for nothing else. The whole administrative organization, indeed, was designed for a petty war of short duration. The changes introduced by Lord Rawlinson, though expensive, have brought the Indian Army up to the requirements of war on an Imperial scale.

THE DISORDERS IN BURMA

By CAPTAIN A. G. FULLER, 20th Burma Rifles.

THE problem of India is a difficult one. But wrapped up in the welter of facts and figures which thinking men are trying to unravel in their search for a solution is the problem of another land; and that land is Burma. The geographical position of Burma, so many miles from India, has so far been a mixed blessing. She has been fortunate in her isolation in the past, because it has spared her the agony of those political upheavals which have been a common feature in India for the last twenty years. Yet she has been unfortunate too, for there is no doubt that her development has suffered in consequence.

But to-day Burma is wrestling with herself and with the rebel within her borders, and it is an agony she could well have been spared, for history is merely repeating itself, and the evil needs to be eliminated before it assumes a more vicious form.

In the history of nations forty-four years is an insignificant period; and forty-four years ago, when Upper Burma was annexed to the Crown, the pacification of the annexed area took more than three years to accomplish. Large numbers of troops were employed. Great losses were sustained, chiefly owing to disease, and the graveyards of many villages and every military cantonment bear witness to the sacrifice of our troops.

This was due, not to the superior numbers of the enemy nor to his superior military skill, but because of the very accommodating facilities which lack of communications and jungle alike give to the waging of guerilla warfare. And after forty-four years conditions are little better to-day. Apart from two great trunk roads in course of development, and the extension of the railway, communications are sadly inadequate, and those that do exist are very inefficient, for the mere presence of road metal is no criterion of the efficacy of a roadway, especially when it has to contend with a considerable monsoon. This lack of good communications is, in the main, the cause of the prolongation of the present trouble, and the military "appreciation of the situation" has no doubt emphasized it. The progress of events certainly has.

The tranquillity of the province was first disturbed in Rangoon twelve months ago by a labour dispute. The police were hard pressed; many lives were lost in most brutal murder and troops were called out to assist. Happily they never fired a shot, and tranquillity soon reigned

again, but not before a serious shock had been administered to the economic life of the city. The presence of certain subversive agents was then discovered. These were short-circuited; guarantees of non-interference were given and peace again reigned.

Then train derailments began; it is significant that one of the trains contained a number of high Government officials. But the gang responsible for the outrage escaped—a rather startling fact when it is remembered there is no secrecy in the East. Then pillage and murder began in Tharrawaddy. The rebels were known to be in considerable numbers, and the fact that they were tattooing was sufficient indication that trouble was afoot. Troops were again called out. The "king's palace" was attacked and destroyed; a few rebels were killed, but many escaped, including of course the "king." Quiet again reigned. The troops were sent home, after assisting the civil power in the most distasteful of all their duties, and the hope was expressed that the rebellion had been suppressed. But no sooner were the troops back in their barracks than the disorders broke out again, and on this occasion in places as far apart as Pyapon, Bassein, Henzada and Thayetmyo. A glance at the map will emphasize the extent of this area. The situation is now very similar to that which existed forty-four years ago. Disorder over a great area; vast jungles and forests, impenetrable for troops operating in regular and orthodox formations; a partially sympathetic populace, which the widespread economic distress is slowly influencing against all forms of settled government.

The point to bear in mind, however, is that the present disorders are not due, as they were in 1886, to the overthrow of the Burmese King and the annexation of his dominion. They are also not an imitation of Indian methods, although it is unfortunate that they should coincide with Burma's demand for separation. Burmans, like most Orientals, are credulous to a degree, and an easy prey to the doctrine of the malcontents, many of whom will be criminals. If this were not so the present disorders would not have spread over such large areas, and with such rapidity, for even rebels must live, and sustenance is not to be found in the jungle fastnesses from which they issue from time to time to perpetrate their outrages.

It is a comforting thought that reinforcements have been sent to the country, for it is evident that the permanent garrison, by reason of numbers, was totally inadequate to deal with such a disorder as the present.

Two British battalions, three Indian, one Indian pioneer battalion and one Indian mountain battery are little enough safeguard for a country larger than France, and when it comes to employing them not only as a field force but as a protection for law-abiding citizens,

every sympathy must be felt for the military commander entrusted with the responsibility of using them to meet both needs, and for the troops to be engaged.

Their task cannot be contemplated with complacency. They will be hampered and discouraged by the discomforts attendant on the monsoon. Monotony, that bugbear of vigilance, will be present everywhere, and watchfulness will be the chief and essential concern of all. False alarms will be frequent and disappointments many, while reverses must be expected, since the rebels will be in the happy position of knowing all the movements of the troops without disclosing their own, so that courage and fortitude will be needed in great measure. Those responsible for supply will be faced with many difficulties, and much money will be needed to overcome them. The area from Rangoon to Tharrawaddy, and then west to Henzada, Bassein and Thayetmyo, is pierced by one trunk road only, fortunately passable for M.T. during the monsoon. But the feeder roads to the river on the west, and the jungles on the east, will be quite impassable for any regular type of vehicular transport. Even in the driest weather a Ford might well rebel on some of these atrocious routes. Some places can be easily reached by river, but the journey is distressingly slow, and the now defunct Royal Indian Marine would have been invaluable on the river route.

Fresh supplies will, therefore, be difficult to maintain, and a good water supply a source of anxiety. Irrawaddy river water is too impregnated with foreign matter to be potable, and if it is necessary to use it, large quantities of alum and intensive chlorination are necessary. These precautions will apply not only to the river water, but to the inland supplies as well. Villages, and Burma is nothing but villages, depend for their supply on irrigation chaungs and surface wells; all these are extremely dangerous. This was demonstrated last year when the Cameron Highlanders marched from Rangoon to Tharrawaddy, a distance of under 100 miles. The water supply along the route, and it was a main road, was so poor and impure that it could not be used, and the difficulty had to be overcome by sending out hundreds of gallons every morning by train to convenient stations along the route, where it was collected by water lorries hired for the purpose. Railways, even government railways, are not philanthropic concerns, and these arrangements were a heavy drain on the training grant. But apart from expense, success will depend on co-operation, a principle of war often sadly neglected; for while it is generally understood in the Army, it is not really surprising that sometimes Shunter Hira Lal may just forget to hook on your water tank, or send it by what he considers to be a better train. These things are not unknown in the Indian Empire.

Then there is the question of disease. Normally, Burma is quite healthy country, but there can be no shadow of a doubt that malaria is everywhere, along with other pleasant and persisting maladies, such as dengue fever and dysentery, which reach the height of their incidence in the wet weather.

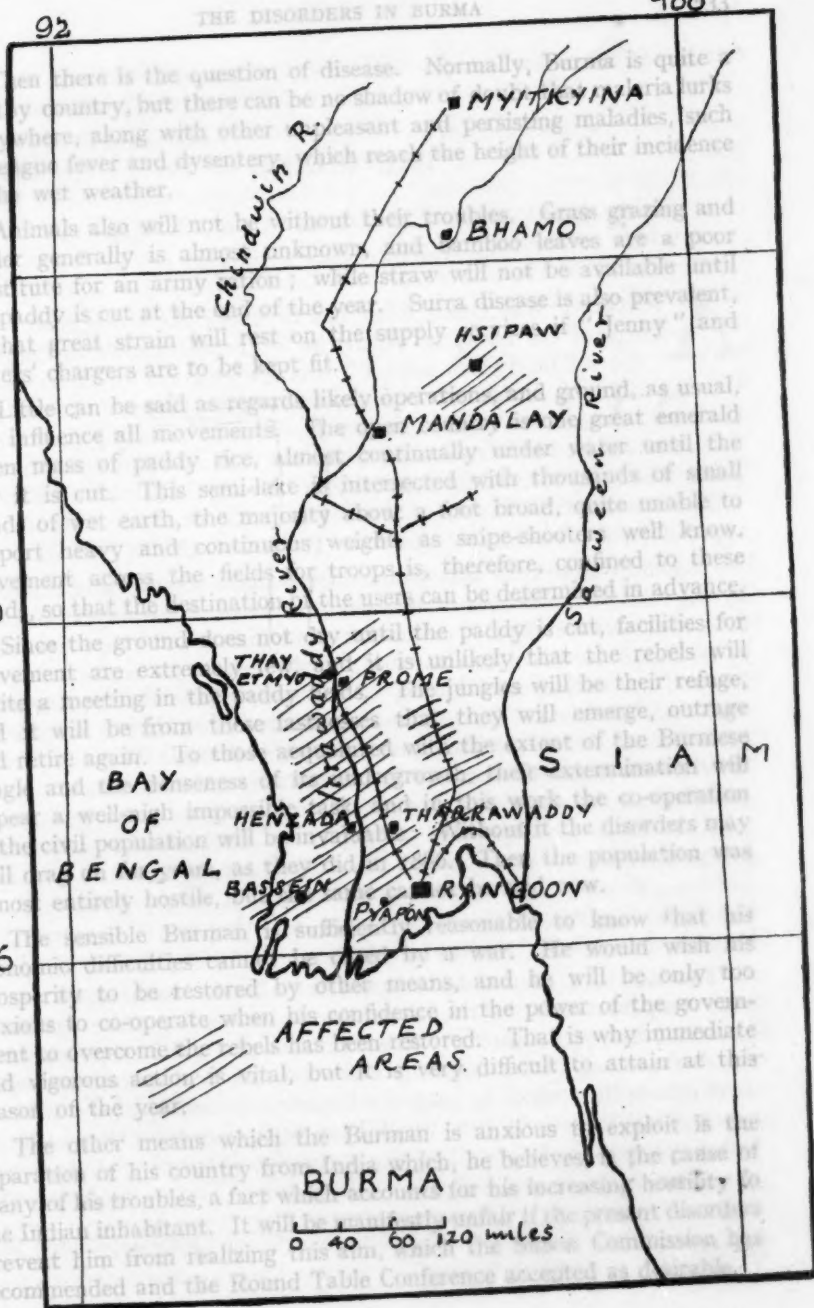
Animals also will not be without their troubles. Grass grazing and generally is almost unknown, and straw leaves are a poor substitute for an army horse, while straw will not be available until the paddy is cut at the end of the year. Surra disease is also prevalent, so that great strain will rest on the supply of "mule" and "pony" chargers are to be met with.

It can be said as regards the open ground, as usual, will influence all movements. The great emerald green fields of paddy rice, almost continually under water until the day is out. This semi-lake, intersected with thousands of small bunds of wet earth, the majority of which are not broad enough to support a man and continue as snipe-shoots, well known. Movement across the field for troops is, therefore, confined to these narrow paths, so that the estimation of the user can be determined in advance.

Since the ground does not support the paddy, facilities for movement are extremely limited. It is unlikely that the rebels will invite a meeting in the open, but the jungles will be their refuge, and it will be from there that they will emerge, outrage and retire again. To those who are familiar with the state of the Burmese jungle and its impenetrability, the co-operation of the civil population will be almost entirely hostile. The population was almost entirely hostile to the British.

The sensible Burman is anxious to know that his country can be restored to its former state. He would wish his prosperity to be restored by other means, and it will be only too anxious to co-operate when his confidence in the power of the government is overcome. This is why immediate and vigorous action is required. This is why immediate and vigorous action is required, but it is difficult to attain at this season of the year.

The other means which the Burman is anxious to exploit is the separation of his country from India, which he believes is the cause of many of his troubles, a fact which accounts for his increasing hostility to the Indian inhabitant. It will be difficult for the present disorders to prevent him from realizing this. The Commission has recommended and the Round Table Conference accepted as desirable.



Then there is the question of disease. Normally, Burma is quite a healthy country, but there can be no shadow of doubt that malaria lurks everywhere, along with other unpleasant and persisting maladies, such as dengue fever and dysentery, which reach the height of their incidence in the wet weather.

Animals also will not be without their troubles. Grass grazing and fodder generally is almost unknown, and bamboo leaves are a poor substitute for an army ration; while straw will not be available until the paddy is cut at the end of the year. Surra disease is also prevalent, so that great strain will rest on the supply services if "Jenny" and officers' chargers are to be kept fit.

Little can be said as regards likely operations, and ground, as usual, will influence all movements. The open country is one great emerald green mass of paddy rice, almost continually under water until the day it is cut. This semi-lake is intersected with thousands of small bunds of wet earth, the majority about a foot broad, quite unable to support heavy and continuous weight, as snipe-shooters well know. Movement across the fields for troops is, therefore, confined to these bunds, so that the destination of the users can be determined in advance.

Since the ground does not dry until the paddy is cut, facilities for movement are extremely few, and it is unlikely that the rebels will invite a meeting in the paddy fields. The jungles will be their refuge, and it will be from these fastnesses that they will emerge, outrage and retire again. To those acquainted with the extent of the Burmese jungle and the denseness of its undergrowth, their extermination will appear a well-nigh impossible task, and in this work the co-operation of the civil population will be invaluable. Without it the disorders may well drag on for years, as they did in 1886. Then the population was almost entirely hostile, but the same cannot be said now.

The sensible Burman is sufficiently reasonable to know that his economic difficulties cannot be cured by a war. He would wish his prosperity to be restored by other means, and he will be only too anxious to co-operate when his confidence in the power of the government to overcome the rebels has been restored. That is why immediate and vigorous action is vital, but it is very difficult to attain at this season of the year.

The other means which the Burman is anxious to exploit is the separation of his country from India which, he believes, is the cause of many of his troubles, a fact which accounts for his increasing hostility to the Indian inhabitant. It will be manifestly unfair if the present disorders prevent him from realizing this aim, which the Simon Commission has recommended and the Round Table Conference accepted as desirable.

THE SHAKO

By BREVET-MAJOR H. FITZM. STACKE, M.C., *p.s.c.*,

The Worcestershire Regiment.

A RECENT War Office letter has informed those Regiments and Corps of the Army in which the head-dress known officially as "the coloured cloth helmet" is still regulation for officers when wearing full dress on special occasions, such as His Majesty's Levée, that the Army Council are considering the question of replacing that spiked helmet by some other form of head-dress; and that a conference on the subject will be held in the autumn of this year. Among the head-dresses which will be considered for adoption there will probably be one or more of those types of head-cover which come under the generic title of "shako."

It is now more than fifty years since a shako was worn in full dress by the bulk of the British Army; and the detail of the successive types of head-dress which figured under that name from 1800 to 1878 is nowhere to be found set down in clear and simple fashion for ready reference. In fact, no authoritative history of the dress of the British Army has ever been compiled. The only comprehensive work on the subject has been Luard's book,¹ written just before the Crimean War; and that volume was intended more for propaganda than for reference. Consequently it is not surprising that many curious errors are to be found in our historical pictures. For example, in Orchardson's well-known painting of Napoleon on board the "Bellerophon," now in the Tate Gallery, the observant eye can detect a British sentry, presumably of the Royal Marines, in the background; and that sentry is depicted as wearing the "Albert" shako of the Crimean War period forty years later.

The lack of a general history of our uniforms has to some extent been compensated for by the information to be found in some regimental histories; but out of the forty-five regiments who will be represented at the forthcoming Conference, only a few possess in their histories sufficient details from which to judge the historic associations of the different types of full-dress head-dress which have been worn from time to time; and in particular the detail of the successive patterns of shako which have been worn in our Army is so little known and so confusing that

¹ "History of the Dress of the British Soldier," by Lieutenant-Colonel John Luard (1852).

perhaps there may be some definite value in the summary here given of those different types of shako and their associations.

In the Wars of the XVIIth and XVIIIth centuries, the head-dress of most regiments of the British Army, as in other European armies, was a wide-brimmed hat of black felt. That hat, originally much like those still affected by clergymen and artists, was looped up, following successive fashions, first on one side, then on three sides, and, finally, after growing to portentous size in the last years of the XVIIIth century, the hat was cocked up flat at front and back, producing the general effect which remains in the popular mind as the traditional head-dress of the Emperor Napoleon. In that last development, the enlarged cocked hat was decorative indeed, but as a military head-dress it had no other virtue, it shaded neither the eyes nor the neck, it was heavy, and it would blow off with any puff of wind. It was imposing in peace time on ceremonial parades, but the hard campaigns which followed the French Revolution showed the need for a more practical head covering; and one after another the armies of Europe adopted a new model.

The model was found in Austria.¹ Unkind Frenchmen averred that the Austrian army existed mainly to enable other armies to win victories; but whatever lack of success the Imperial troops might have in the field, in matters sartorial they were admittedly pre-eminent. During the XVIIIth century, even the proud French army of the *ancien régime* had paid their old enemies the sincerest form of flattery, copying the cock of their hats, the white uniforms of their infantry², the fur caps of their grenadiers, and the entire costume of their Hungarian hussars.

The British Army had followed Austrian fashions as closely as had the French, and with better reason, for the Austrians were constantly our Allies. The influence of King George II had given British uniforms a Prussian aspect from about 1740 until after the Seven Years' War. Then Austrian influence came into play. Black fur caps of Austrian design replaced in 1768 our grenadiers' cloth caps of Prussian fashion, white breeches with black Austrian gaiters were adopted instead of the Prussian white gaiters, sashes were worn in the Austrian manner round the waist. In 1783, our light dragoons received new jackets braided after the manner of the Emperor's hussars, and in general our army uniforms were altered to follow the fashion of elegant simplicity set by the Austrian officers. Consequently it was not surprising that soon

¹ Technically, of course, the "Holy Roman Empire" until 1806.

² Originally (*circa* 1690) in both the French and the Austrian armies the infantry wore serviceable coats of dull pearl-grey. This gradually became lighter in shade. About 1740 the Austrian infantry definitely adopted white coats, and the French followed suit about twenty years later (*circa* 1762).

afterwards a new Austrian style of head-dress should have been readily accepted.

The Austrian Empire of the late XVIIIth century was even less homogeneous than in 1914. Its outlying provinces included many semi-barbarous peoples—Pandours, Tolpatches, Croats, Bosniaks, Ruthenes—separated from other kindred peoples under Turkish rule by a somewhat indeterminate frontier. That frontier was in constant unrest, and order was maintained there with difficulty by a special "Frontier Force"—seventeen regiments of *Grenz-infanterie*, recruited mostly from the Magyars of Hungary and specially equipped for that hard service. Originally those frontier troops seem to have used the head-dress then worn by the Hungarian hussars and common to many peoples of Eastern Europe at that time, a high flat-topped cap without a brim; but the need



Hungarian
"Grenz-infanterie,"
1796.

of a shade for the eyes seems to have become apparent. Probably the eye-shade was at first introduced unofficially. In 1796, however, the practice was regularised; a leather peak was added officially to the high cap of the *Grenz-infanterie*; and thus originated the shako.¹

The word "shako" is of Magyar origin, derived from *Csak*, i.e., "peak," and means simply a peaked cap.² The new-fashioned peaks must have proved useful in the work of the frontier troops, for two years later the Hungarian hussar regiments similarly added a peak to their high caps.³ Other units and corps of the Austrian service followed suit, and the new fashion soon spread to other countries.

The *Grenz-infanterie* and the hussars were both "light troops," and the new head-dress was at first regarded as specially appropriate for scouts and skirmishers. Some regiments of the French *Infanterie Légère* adopted a shako in the last years of the



Hussar,
Imperial (Austrian) Army
1770.



Hussar,
Imperial (Austrian) Army
1798-1806.

¹ See "Die Oesterreichische Armee," (Ottenfeld and Teubel), pp. 273-5.

² See the New English Dictionary. The full form is "Csakós süveg," the latter being the word for "cap"; but the term "shako" is also used loosely in French works for the previous brimless cap.

³ See "Die Oesterreichische Armee," pp. 300-3.

XVIIIth century, and in the British Army the colonels of some regiments equipped their light companies experimentally in "caps after the Austrian fashion." Once introduced, the advantages of the new-fashioned head-dress were obvious as against the cumbrous cocked hat. The new cap was half the weight of the cocked hat, it balanced fairly on the head and provided a shade to the eyes. Moreover, it was the new Austrian fashion, and that alone was then a powerful argument. The wishes of practical soldiers were for once in accord with those of the arbiters of fashion; and, on the 24th February, 1800, a General Order introduced the shako as the regulation head-dress for all British infantry.

That first British shako¹ was closely modelled on its Austrian prototypes, being of straight "stovepipe" shape, cylindrical, and as wide on top as below. It was made of lacquered leather and was ornamented in front with a large brass plate, above which was the black cockade of the Hanoverian dynasty and a short worsted plume—white for the grenadier companies, green for light infantry, and for all others the English national colours, red and white.

The stiff ceremonial of the later XVIIIth century was still in vogue—powdered hair and high leather stocks² were still essential attributes of a soldier's dress when the shako was introduced—and officers of the old school regarded the new cap as lacking in dignity. It was regarded as a head-dress for field service rather than for ceremonial occasion; and it was not at first worn by the officers, who continued to parade in the huge "athwartships" cocked hat. Although it shaded the eyes, that first shako did not protect the neck sufficiently for hot climates; and in the expedition to Egypt of 1801 some at least of the British infantry were equipped specially with a different head-dress—a low felt hat with a wide curly brim, not unlike the present-day "bowler," although made more martial looking by a cockade and plume.³ But that head-dress was dropped after the Egyptian campaign, and the line regiments fought in the original pattern of shako at St. Lucia and Surinam, at Maida,⁴ at the Cape of Good Hope, in the unfortunate expedition down the

¹For the appearance and details of this and the subsequent types of British shako see the pictorial table at the end of this narrative.

²Queues and powder remained until abolished by the Duke of York in 1808; the leather stock survived till after the Crimean War.

³That head-dress had been evolved some years beforehand, and is shown in the well-known pictures of the Storming of Seringapatam, 1798. It is not easy to find how long it lasted in India and elsewhere abroad.

⁴The battlefield of Maida witnessed one of the quaintest episodes in the long and eventful record of the shako, when the 27th Regiment, while washing off the stains of battle by bathing in the sea after the fight, were suddenly startled by an alarm of French cavalry approaching and, rushing from the water, seized their arms and accoutrements and fell into line "ready to give a good account of themselves, without a shred of clothing." (Fortescue, Vol. V, p. 351). Whether they donned their shakos is not actually recorded, but it was a day of blazing sunshine.

South Atlantic to Buenos Aires and in the opening campaigns of the Peninsular War.

The year 1808, which saw the beginning of the long struggle in the Peninsula, witnessed the final abolition of powdered hair, which for several years had been out of fashion in civilian circles. Most regiments joyfully cut off their pigtails before landing in Portugal, but some old-fashioned corps fought in powdered hair below their "stove-pipe" shakos in the initial action at Rolica.

Meanwhile the fashion for the new head-dress had been spreading through Europe. The French *Infanterie Légère* had adopted the shako, as we have seen, before 1800; and about 1800 the French hussars copied the new cap of their Hungarian prototypes. One after another the armies of the various German States followed suit, as also did the Russians (in 1805), and the Austrian regular infantry (in 1806).¹ Soon nearly all the regular armies of Europe were similarly attired. During that general adoption of the new head-dress a tendency arose to widen the top of the shako, thus giving it a more artistic shape and greater dignity; and in 1806² a broad-topped shako of this type was prescribed for all French infantry by the Emperor Napoleon, replacing the slatternly cocked hats in which the Revolutionary armies of France had swept through Europe. The Emperor had evolved a theory that a tall head-dress was of tactical advantage, increasing the apparent height of the wearers, thus leading their opponents to aim higher and possibly to miss. So the new French shako was a tall head-dress of black felt, ornamented in front with a worsted tuft³ above a brass plate. Although wider at the top, that new French shako was so similar in general silhouette to the British pattern that a more distinctive head-dress for our troops was felt to be necessary; and a new pattern of shako was designed for our Army, made distinctive by having the plume fixed at the side.



French Infantry,
1806.



Austrian Regular
Infantry,
1806.

When was that shako—the "Wellington" shako—introduced? Curiously enough, the date of introduction appears to be uncertain, and the opinion of experts is divided. In the War Office records there is to be found a General Order, dated 20th

¹ The shako adopted in 1806 by the Austrian regular infantry was notable for having a peak at the back as well as in front—of which more subsequently.

² Decree dated 26th March, 1806.

³ A feather was worn on ceremonial parades and also sometimes in the field.

October, 1806, ordering the adoption of a cap of black felt in place of the previous cap of black leather, this cap to be "in strict conformity to a Pattern Cap which is lodged at the Office of the Comptrollers' of Army Accounts."

The sealed pattern referred to has long since disappeared. Later, in 1811, a Board of General Officers reported on the clothing of the Army, and said "Cap—objectionable as to form, unsteady on the head; little use against the weather or sword cuts. New cap to be made as per pattern submitted."¹

That second sealed pattern has also vanished, but there can be no doubt that the pattern then introduced was the "Wellington" shako in its final form—the body of the cap made low and shaped behind like a jockey cap to fit the back of the head. There is however reason to think that the cap authorised in 1806 was also of the general shape shown in our sketches as the "Wellington" shako, but higher in the head than the 1811 form and cut straight across at the back. Evidence for this is found partly in prints and pictures of the British Army, which, even if not exactly contemporary, were at least executed so soon after the events as possibly to be right as to the dress; notably the well-known print of "The Buffs at Albuhera," published by Edward Orme in 1818.

The battle of Albuhera was fought before the General Officer's Report mentioned above, but, since that print was published seven years after the

event, the print by itself is not conclusive evidence that the "Wellington" shako was worn at the period of Albuhera. More definite evidence is perhaps to be obtained from another line of enquiry. Bradford's "Sketches of Character and Costume in Spain and Portugal"² definitely shows Portuguese infantry wearing a variant of the "Wellington" shako in prints dated 1809. At that period the Portuguese army was being reorganized and re-equipped from Great Britain. British generals and British regimental officers lent to our Allies were busily turning the Portuguese regiments into worthy imitations of British infantry; it is probable that their clothing and equipment was largely supplied from England; in fact the accompanying plates of their cavalry uniforms show the Portuguese horse wearing the head-dress of British light dragoons; and it is likely that their infantry head-dress likewise followed the British fashion; so



Portuguese Infantry,
1809.

that their infantry head-dress likewise followed the British fashion; so

¹ Quoted from Leask and McCance's "Records of the Royal Scots."

² A copy is to be found in the Library of the R.U.S.I. The print from which our sketch is copied bears date 20th November, 1809.

the fact that Portuguese infantry were wearing a version of our "Wellington" shako in 1809 is fair (although not conclusive) evidence that it had been introduced in the British Army before that date.

Whatever may be the truth as to the date of introduction of the "Wellington" shako, its adoption was certainly gradual; for in those days the clothing of regiments was left in the hands of their colonels; and actually some regiments continued to wear the original "stove-pipe" shako throughout the Peninsular War and until Waterloo. But most of the British infantry were re-equipped with the new and distinctive head-dress before 1812 and wore it triumphantly in the later battles of the Peninsular War—at Salamanca and Vittoria, at the storming of San Sebastian, in the sharp actions of the Pyrenees, the Nivelle and the Nive, before the battlements of Toulouse and, later, on the epic fields of Quatre Bras and Waterloo.

The "Wellington" shako was indeed a very satisfactory head-dress, combining the comparative lightness given by its low body with the dignity conferred by the raised front, made distinctive and ornamental by its plume at the side and cords across the front, and well shaped behind to fit the head. It is interesting also as having been the only type of shako evolved independently in this country. It is true that the regular infantry and artillery of the Austrian army had worn, from 1769 to 1798, a head-dress which they called a *casquet*, with a low body and raised front, but the body was made much lower than in our cap, and was cut in a straight line without peak in front or curved shape at the back, while the raised front was semi-circular and flat. The new British design may equally well have drawn its inspiration from the old cloth grenadier caps of our own Army or from the brass-fronted caps of Prussian fusiliers.



"Casquet" of Austrian Infantry, 1798.

Whatever the inspiration, the designers of the new British shako produced a result definitely different from Continental models; and, taken all round, the "Wellington" shako was as practical and distinctive a head-dress as has ever been worn by British infantry.

Strangely enough the occupation of Paris which followed Waterloo resulted in the abolition of the head-dress in which that victory had been won. The British battalions marched into the French capital wearing their battle-worn "Wellington" shakos—a famous café in the Champs Elysées is still decorated with a contemporary print showing *Militaires anglais* wearing that distinctive head-dress—but there they were encamped side by side with the picked troops of the other Powers; and,

although practical and distinctive, the "Wellington" shako was not as imposing as the shakos worn in 1815 by most of our Allies. Since the early days of the century the armies of Central and Eastern Europe had been increasing the size of their shakos to get decorative effect; and the Prussians in particular were conspicuous at the parades which followed the occupation of Paris.

The British were billeted in Montmartre, while the German troops were quartered around the Palais Royal; and the Prussian regiments marched down the Champs Elysées in all the tramping majesty of their parade step, their dark uniforms topped by wide shakos of colossal dimensions, adorned with silver ornaments, festoons of plaited cap-lines and towering black plumes which enabled the giants of the Prussian Guard altogether to overtop the more modest array of the British infantry.

Such inferiority was not to be tolerated, decided the Prince Regent; and on the 22nd August, 1815, orders were issued to replace the "Wellington" shako by a new shako, modelled after the Prussian pattern—more than seven inches high and nearly a foot across the top, with bands of gold lace and a plume twelve inches long.¹ Thus attired, any of the Prince Regent's regiments could hold its own with the Prussian Guard on ceremonial parades; and that broad-topped "Regency" shako remained thenceforward the full dress head-dress of the British Army for more than twenty years. During that period our Army was sadly reduced, and those line battalions which survived were mostly scattered in obscure garrisons overseas; but they may have found some consolation during their exile in the knowledge that for decorative effect their full dress uniform could not be surpassed.

Some sharp fights in India—Kirkee and Maheidpore—saw the tall plumes of the "Regency" shako rising through the battle-smoke; but later it became customary to remove the plume and sheath the shako



Prussian Guard,
1815.

¹ Those plumes were of the same colours as before, viz., white for grenadier companies, green for light infantry, red-and-white for all others. Subsequently, for a short period, 1830-35, a plain white plume was worn, instead of the red-and-white, by all except light infantry, who then adopted a green ball-tuft. Previously some of the light infantry—notably the 51st—seem to have worn a drooping green plume, similar in style to those worn then by our light dragoons.

in a waterproof cover for service in the field. It is thus that the "Regency" shako appears in the prints depicting the First Burmese War—Ava and Kemmendine—and also some fights, notably Kelat, of the First Afghan War.

Presently, when good and practical King William IV had succeeded his flamboyant brother,¹ it was felt that the tall plumes were out of date. In France and other countries tall plumes had been replaced by "pom-poms" or short tufts; the British Army must be in the fashion; and the plume, which had been shortened from 12 inches to 8 inches in 1830, was replaced in 1835 by a worsted ball tuft.²

But the substitution of ball-tufts for plumes could not materially affect the weight of the big broad-topped shako, which was definitely too heavy for drill parades or for field service in hot climates. For drill parades a small round forage-cap had come into wear, and in India it became customary to wear that forage cap, with a loose white cover which shaded the eyes and the neck, on active service. It was in forage caps with white covers that the 22nd fought at Meanee and the 13th at Jellalabad; and that same head-dress was worn by most of the British regiments engaged in the two Sikh wars and subsequently also in the Indian Mutiny.

In France likewise, events had proved the unsuitability of the broad-topped shako for active service in hot climates. Successive campaigns in Algeria had led to a demand for a lighter head-dress, and in 1837 the broad-topped shako of French infantry was replaced by another pattern, practically reverting to the original "stove-pipe" shape. Where the French led, other nations were sure to follow;

¹ In 1828, shortly before the accession of King William IV, a series of changes were made, bringing our uniforms into close similarity with those of the Prussian Army at that time. As regards the shako, the bands of gold lace were replaced by bands of black leather, the height was somewhat reduced, and a large brass star was introduced; this was borrowed from the Prussian Guard, whose distinctive device was a Star as against the "Spread Eagle" of the Prussian Line.

Plaited cap-lines of the Prussian pattern were introduced in 1828 but were abolished two years later, in 1830.

At that period (and thenceforward till 1878) the 71st Regiment (Highland Light Infantry) wore a shako similar in shape to the rest of the Line but of blue cloth with a diced band and black plaited cap-lines. The 74th Highlanders were permitted to adopt a shako similar to that of the 71st in 1845; and the 91st Highlanders were allowed to follow suit in 1864.

² Those worsted ball-tufts were of the same colours as previously—white for grenadier companies, red-and-white for the battalion companies and green for light infantry. The light infantry had worn green tufts instead of feathers since 1830.

and during the late 'thirties and early 'forties the armies of Europe one by one discarded broad-topped shakos and adopted others, lighter, simpler, and with a tendency to be narrower at top than bottom. British conservatism resisted the change for some few years; but the advent of Prince Albert resulted in an impetus towards improvement on continental lines, and presently it was decided to discard the broad-topped shako and conform to the current tendency abroad by adopting a lighter model.

The pity is that in seeking a lighter and more practical head-dress in 1843, there was never a thought of reverting to the historic "Wellington" shako of Peninsular days; but the early-Victorian mind looked forward to progress, not backwards to romance, and any new head-dress had to be up-to-date. The obvious model at that time was the shako which the French had been wearing during the previous six years; and in close imitation of that French head-dress the new British shako designed in December, 1843, was made absolutely cylindrical, of black felt, with bands of leather at crown and base; but to the general shape of the French shako



Austrian Infantry,
1836.

was added a feature which had been characteristic of the Austrian army shako ever since 1806, namely a drooping peak at the back as well as in front, to afford some protection to the neck as well as to the eyes. Thus, by a combination of the best that France and Austria could give us, was evolved the "Albert" shako of 1844.

The artistic merit of that head-dress is a matter of opinion, but it was tolerably comfortable, sitting well balanced on the head and affording fair protection. Withal it was dignified, although that new and ribald journal, "Punch," was always poking fun at its double peaks; and in that head-dress the British regiments¹ went out to the Crimean War, stormed the heights of the Alma and fought heroically in the mist at Inkerman. But active service proved the dress of the British troops to be generally unpractical and cumbersome compared with the easier kit of our French allies; and in the later stages of the campaign a revolt took place. Coatees and shakos were discarded



French Infantry,
1837.

¹ Including the fusilier regiments, who temporarily lost their fur caps when that new shako was introduced, and were ordered to wear shakos, distinguished only by white ball-tufts, like the grenadier companies of other regiments.

in favour of drill jackets and forage caps; and it was in the latter informal attire that the British infantry made their gallant but unsuccessful attack on the Redan.

The Crimean War resulted in a sartorial revolution in British uniforms. The old dignified costume was swept away; coatees, stocks, epaulettes, cross-belts and the Albert shako all went by the board; and our regiments were re-clothed in loose, full-skirted tunics, baggy trousers and a smaller, lower shako, which tilted forward in the new French fashion; for the hard Algerian campaigns had led the French soldiers to lighten their head-dress by removing the stiffening, so that the flat top sagged forward towards the peak. Consequently, to have one's cap tilted forward became the sign of a really useful soldier; and the fashion spread. Old-fashioned Austrians and Swedes might keep the tops of their caps horizontal, but the American armies of the Civil War, both North and South, tilted their caps



In Algeria
1847.

forward in imitation of the French; Mexicans, Peruvians, Belgians, Norwegians and Swiss all followed the French mode; and the British Army could not be permitted to lag behind.

With this new tilted shako—made at first of the traditional black felt¹—regiments continued to wear ball-tufts of the same colours as before, save that the grenadier and light companies of line regiments were abolished² and that light infantry regiments presently received permission to wear a drooping plume of green.³

Fashions did not last long in those days, when the Emperor Napoleon III was constantly altering the brilliant uniforms of his army, and in March, 1860, the French infantry changed their shakos to a new model—smaller and lighter, with a peak cut



Austrian Infantry
(Colonel),
1856.

¹ And ornamented in the case of field officers by bands of gold lace round the top of the cap—a feature borrowed from the contemporary Austrian shako.

² The Light company of the 46th had long been distinguished by a red plume or ball-tuft instead of the usual green—a traditional honour since 1777. When "flank" companies were abolished, the whole regiment obtained permission to wear a red ball-tuft.

³ Probably imitated from the German *Jägers*; although our own light dragoons had worn similar drooping plumes since 1823. The French *chasseurs-à-cheval* had first adopted drooping plumes in 1822.

square and absolutely flat. Before the year was out the British Army had dutifully copied the new French cap, and authorised—in November, 1860—a small light shako made of quilted blue cloth, with a flat peak cut square after the French model,¹ ornamented solely by a small brass star bearing the number of the regiment, save that senior officers were allowed a narrow band of gold lace round the cap's upper edge.



French Infantry,
1860.

That French-pattern head-dress might conceivably have proved light and easy for active service had occasion arisen, but it was never worn in the field; for the white pith helmet was then coming into use in India, and that more efficient head-covering was worn in the Abyssinian campaign. Meanwhile, the undistinguished appearance of the new blue shako led to discontent, and in 1869 a variant was authorised. The instinct to copy the French army was too strong to permit any deviation from the general shape, but the height of the shako was slightly lowered, the cap was made of stiff, smooth cloth, a more ornamental cap plate replaced the plain brass star, and for all officers bands of gold braid were introduced around the top and lower edge of the cap and down the sides. That profusion of gold braid was copied from the contemporary Austrian shako and made the cap distinctly more ornamental—especially when combined, as in three of the Scottish regiments, with plaited black cap-lines and a diced border round the shako's lower edge.² English light infantry took to dark green shakos with a black ball-tuft, and Royal regiments adopted ball-tufts of red worsted instead of the usual red-and-white.

Nevertheless, the shako in that last phase had definite disadvantages. It was not really heavy; but it seemed so because, owing to the tilt forward, all the weight bore upon the forehead. Also it provided no shade to the neck. Besides, it was not at all imposing, and the little French cap had no such historic traditions as had accumulated round the bearskins of the Foot Guards, the feather-bonnets of the Highlanders or the busbies of the Hussars. Sappers and gunners also wore busbies in the 'sixties and 'seventies, and the Line regiments alone³ had to wear

¹ That type of peak did not last long in the French Army, being discarded in 1872.

² The 71st (Highland Light Infantry) wore a green ball-tuft on their blue shako. The 74th and 91st Highlanders wore a shako like the 71st but with a red-and-white ball-tuft.

³ Except for the A.S.C., who wore the shako with a black drooping plume, and certain Departmental Corps.

the small French shako. Patient as usual, they bore the little tilted shako without protest; but seemingly were pleased when service in India or in Canada¹ allowed them temporarily to assume some preferable head-dress.

Then suddenly the days of French supremacy came to an end. For thirty years the French army had set the fashions to nearly all the military world; but one country had stood out as an exception. In 1843, when all other armies were adopting "stove-pipe" shakos in place of the broad-topped shakos of the preceding years, the Prussian army had taken a line of its own and had developed a different head-dress—a helmet of black leather with a large brass spike. That head-dress had at first been generally derided. The Russians had adopted it for a while, only to discard it after the Crimean War; but the growing power and efficiency of the Prussian army soon caused it to be taken seriously. Their victory over Austria in 1866 was followed in 1870 by the smashing defeat of France. Before this new power both our sartorial models of previous years were humbled in the dust. The shock to traditional habits of thought was too great for immediate action; besides, our army just then was convulsed with Mr. Cardwell's reforms and the abolition of purchase; so that it took eight years before those responsible fully realised that small, tilted shakos with square, flat peaks connoted inefficient soldiers, failure and disaster—whereas clever, efficient, successful soldiers wore spiked helmets. But by 1878 the lesson had been fully digested, and in that year orders were issued abolishing the shako and introducing in its stead a spiked cloth helmet, which in design was a compromise between the Prussian *pickelhaube*, our own white helmet as then worn in India, and the blue helmet of an English policeman. That symbolism, though probably unintentional, was not inapt; and the new helmet had a practical advantage in that it was well-balanced. Its shape, certainly, was not becoming; and "Punch" expressed the popular view by objecting in forcible verse to that latest imitation of foreign dress and to the resultant "Prusso-Russo-Bello-Gallo-British Grenadier"; but for want of a better idea the blue helmet remained for more than fifty years as the full-dress head-dress of the greater part of our Army, worn frequently on ceremonial parades but never in battle.

The history of the shako as a British head-dress was still not ended; for by some means the Highland Light Infantry succeeded in getting

¹ Many Line regiments were stationed in Canada during the 'sixties; and an inspection of old photograph books of that period in their messes will show the enthusiasm with which officers got their portraits taken in the fur caps which regiments in Canada were permitted to wear—caps much like the present head-dress of the Rifle Brigade.

THE SUCCESSIVE TYPES OF SHAKO WORN BY BRITISH

1. 1800-09

(Copied from the original Austrian shako).

Authorized 24 Feb., 1800.
Made of black lacquered leather.

Height, 7".

Top about 6½" across.

Plumes—

Grenadiers—White.

Light Infy.—Green.

Others—Red-and-white.



BATTLES
IN WHICH WORN.

Egypt, 1801. Copenhagen.
(?) Assaye. (?) Laswarree. (?) Deig.
St. Lucia, 1803. Surinam.
Cape of Good Hope, 1806.
Maida. Montevideo.
Roleia. Vimiera. Corunna.
(and by some regiments throughout
the remainder of the Peninsular
War and until Waterloo).

2. (?) 1809*-1815

THE
"WELLINGTON" SHAKO.
Authorized (?) 20 Oct., 1806.*
Introduced during the Peninsular
War.

Made of black felt.

Height—Front about 7".

Back about 6".

Plumes—Colours as in No. 1.

Cap-lines—

Officers—Gold-and-crimson.

Rank & file—White.

(except Light Infy.—Green.)



(?) Corunna. Douro. Talavera.
(?) Bourbon. Martinique. Guade-
loupe. (?) Java. Barossa. Fuentes
d'Onor. Albuhera. Almaraz.
Busaco.

.....
Ciudad Rodrigo. Badajoz.
Detroit. Salamanca. Vittoria.
Miami. Pyrenees. San Sebastian.
Nivelle. Nive. Orthez. Toulouse.
Bladensburg.
WATERLOO.
(See Footnote).

3. 1816-1835†

THE "REGENCY" SHAKO.
(Copied from the contemporary
Prussian Guard).

Authorized 22 Aug., 1815.

Made of black felt.

Height, 7½" in 1816; reduced to
6" in 1828. Top, 11" across.

Plume, 12" high in 1816; reduced
to 8" in 1828. (Colours as in

No. 2, 1816-30; white plume in-
stead of red-and-white, 1830-35).

Cap-lines (as in No. 2) worn
during 1828-30.



Kirkee. Nagpore. Maheidpore.
Ava. Kemmendine. Bhurtpore.
South Africa, 1835.

4. 1835†-1843

Authorized 27 Aug., 1835.

Made of black "beaver."

Height, 6" in 1835; raised to
6½" in 1842.

Top, 11" across.

Ball-tufts—

Grenadiers—White.

Light Infy.—Green.

Others—Red-and-white.



Afghanistan, 1839-42.

Ghuznee. Kelat.

(In other battles of this period
forage-caps were worn).

* See the accompanying article for the doubt as to whether the "Wellington" Shako was introduced in 1806 or in 1811. If the latter date is correct, the battles above the dotted line should not be entered against this shako.

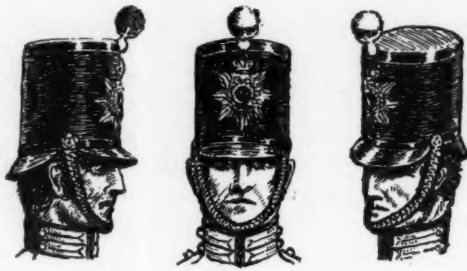
† Alternatively, 1828 might be taken as the date of change from No. 3 to No. 4, since in that year the lace bands were replaced by black leather, the height lowered to 6", and the big brass star introduced; but the plume was retained until 1835, when the introduction of the ball-tuft definitely altered the appearance of the head-dress.

BRITISH LINE REGIMENTS, 1800-1878

4A. Another shako, intermediate in shape between Nos. 4 and 5, was authorized on 21st September, 1843, but only reached a few regiments, being replaced almost at once by No. 5

5. 1844-1855

THE "ALBERT" SHAKO.
(Copied from the contemporary French and Austrian models).
Authorized 4 Dec., 1843.
Made of black "beaver."
Height, 6½".
Top, 6½" across.
Ball-tufts—As for No. 4.

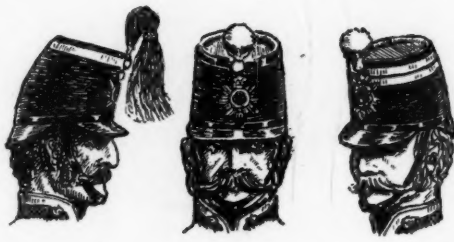


BATTLES
IN WHICH WORN.

Alma. Inkerman.
(In all other battles of this period forage-caps were worn).

6. 1855-1860

(Introduced after the Crimean War. Modelled after the contemporary French pattern).
Authorized 16 Jan., 1855.
Made of black felt.
Height, front 5½"; back 7½".
Top, 1" less diameter than bottom.
Distinctions—
Light Infy.—In 1855, green ball tuft. After 1856, drooping green plume.
All Others‡—Red-and-white ball-tuft.



Taku Forts, 1860. Peking.
(In these actions the shako was worn with a white cover. In all other actions of this period forage-caps were worn).

7. 1861-69

(Copied from the contemporary French pattern).
Authorized 28 Nov., 1860.
Made of blue ribbed cloth.
Height, front 4½"; back 7½".
Top, 6" x 5½".
Distinctions—As for No. 6.‡



NIL.
(In all engagements of this period either white helmets or forage-caps were worn).

8. 1869-78

(Copied from the contemporary French pattern).
Authorized 1 June, 1869.
Made of blue cloth.
(Dark green for Light Infy.)
Height, front 4"; back 6½".
Top, 6" x 5½".
Distinctions—
Royal Regts.—Red ball tuft.
Light Infy.—Black ball tuft.
All Others‡—Red-and-white ball tuft.



NIL.
(In all engagements of this period either white helmets or forage-caps were worn).

NOTE.—In Nos. 5, 6, 7 and 8, the left-hand figure is in each case a Light-Infantryman.
‡ The 46th Regt. wore a red ball-tuft.

permission to retain their distinctive shako, with diced border and dark cap-lines; and in 1894, after the English Rifle Regiments had taken to fur busbies, the Scottish Rifles also made application for a distinctive head-dress, and adopted a dark green shako of shape similar to that of the H.L.I. but rather higher and with a green plume. Subsequently, in King Edward's day, efforts were made to bring back the shako as a general head-dress, but without result. Now at long last the question is again to be reconsidered.

From this narrative and the attached table it will be seen that if, amongst other forms of head-dress, the shako comes up for consideration, four widely different types of shako have each some claim to be adopted; on different grounds. The small French-pattern shako of the 'sixties and 'seventies is the lightest and presumably the cheapest, but it is undistinguished in appearance and has no historic associations so far as the British Army is concerned. For the rest, the "Wellington" shako, the "Regency" shako and the straight-sided "Albert" shako of Crimean days, have each a definite appeal for the regiments which wore them in the battles recorded on their Colours. Some regiments fought in the Peninsula and not in the Crimea, others in the Crimea alone, so that the historic appeal of the "Wellington" and the "Albert" shako respectively varies in each case. Apart from those two types, the "Regency" shako is the most decorative of all, but heavy of course and correspondingly expensive.

So far then as the shako, amongst other forms of head-dress, is concerned, a consideration of the respective advantages and defects makes it appear unlikely that there could be unanimous approval of any one of the differing types we have described. The feeling of the various regiments and corps on this subject must necessarily be swayed by their own historic association with one type or another. But in the old Line regiments which made their name in the Peninsula, at Waterloo, in India and in the Crimea, there are many who would receive with pleasure permission, if granted, once more to carry the historic head-dress which their forbears wore under the enemy's fire in those far-off days which saw the building of the British Empire.

ICEBREAKING OPERATIONS IN THE WHITE SEA, 1918-19

By R. BARRY O'BRIEN.

(The author of this narrative served in the icebreaker "Sviatogor" throughout the operations described, first as navigating officer, and subsequently in command.—EDITOR).

HAD the legendary Russian military "steam-roller" been able to develop its maximum driving power, when it rolled into Austria during the early days of 1914, the history of the Great War might have been written differently. It failed to do so because of that lamentable shortage of rifles and ammunition, which meant that only one Russian soldier in every three was properly equipped. Great Britain and France did what they could to make up the deficiency, but before their efforts had a chance to make any real impression Russia had become isolated: in the South, by the closing of the Dardanelles; in the North, by the freezing of the White Sea, through which lay the route to Archangel.

During the winter of 1914-15, more than one merchant vessel laden with supplies for the Imperial Russian Government made a valiant if unsuccessful attempt to break through that ice barrier. One of the most noteworthy of these attempts was that of the Cunard liner "Thracia." Leaving Liverpool on 27th December, 1914, she reached the White Sea on 7th January, and was immediately pushed into the ice, in the hope that clear water would be found beyond it. But the ice became gradually worse, and despite all efforts to keep her going, the liner became hopelessly stuck. With the assistance of the only available icebreaker she was brought back to open water, to wait for a more favourable opportunity of breaking through. This did not present itself, for when, on 24th January, accompanied by the icebreaker, she made her second attempt, the ice had become very much more heavily packed. Before she had penetrated many miles into it, the "Thracia" found herself so completely jammed that even with the icebreaker doing her level best to help her she could not move at all. She was properly nipped, and for the next three months she remained in this precarious position, drifting hither and thither with the moving icefields. Her

commander made many valiant attempts to moor her to the stationary land ice, but these proved unsuccessful. During this trying time much damage to her hull was caused by ice pressure, and the pumps had to be kept going continually to keep her afloat. When at length, in the Spring, she reached Archangel, she had to undergo extensive repairs before returning to England.

The need of an efficient fleet of icebreakers having been thus emphatically demonstrated, a number of these craft were laid down in Great Britain to the order of the Imperial Russian Government; but before they were ready to play the part assigned to them, Russia had fallen out of the war. It remained to them, therefore, to test their worth in the subsequent military operations in Northern Russia.

Towards the end of 1918, when the ice began to form in the White Sea, there were four well-equipped icebreakers ready to maintain the communications of the allied and General Wrangel's troops on the Archangel front. Two of these craft, the "Kniaz-Pogarski" and the "Cosma-Menin," were manned by Russians; the other two, the "Sviatogor" and the "Alexander," were commissioned by British crews consisting mainly of Naval Reserve officers and men. In the early spring of 1919 these four vessels were reinforced by two French icebreakers, the "Olga" and the "Mikula," which had been commissioned in France. A seventh icebreaker, the "Canada," which had been built for work in the St. Lawrence and acquired by the Russians, completed the icebreaker fleet. The latter ship had very fine lines, and with her clipper bow and powerful engines was singularly efficient at forcing her way through broken pack ice; but, on account of her narrow beam, she was not suitable for conducting other vessels through ice, consequently she was not used for this purpose. The "Canada" was, in fact, an ice-cutter; the other vessels were icebreakers.

Merchant vessels bound for Archangel with supplies and reinforcements always put into Murmansk, which had the advantage of being an ice-free port throughout the winter, and which was used as an allied naval base. Here they were coaled and given their instructions; sometimes their hulls were strengthened for the ordeal ahead of them by being shored up internally with baulks of timber.

The open sea passage from Murmansk to the beginning of the icefields, which stretched across the entrance of the White Sea, is about 240 miles, and the icebreakers found this a particularly bad stretch of water in stormy weather. Built with rounded sides for greater strength and beam, and without bilge keels or proper bow, they were abominable seacraft at the best of times, and rolled atrociously; when head on to a big sea they fairly buried themselves in it.

To appreciate the difficulties with which they had to contend, once they had worked their charge or charges into the ice, something of the ice conditions in the White Sea must be understood. Its surface is not covered by smooth, lake-like, more or less stationary ice, as is popularly imagined, but by a huge mass of broken-up floe ice, three to five feet thick, which is tightly packed together, and continually drifting with wind and tide. In the bottle-neck entrance of the White Sea, known as the Gorlo (throat), this pressure is particularly severe, especially in strong north-easterly or south-westerly winds, which drive the ice in such quantities into that confined area that it piles up on all sides in hummocks and pressure ridges, many feet high. On the Orlovskaya Shoals, at the northern entrance of the Gorlo, these hummocks yearly attain a height of from thirty to forty feet, being visible many miles away. Normally, when the tides are ebbing or flowing at their strongest the ice pressure is greatest; at slack water there is generally some loosening of the pack which results in small lanes of clear water, known as "leads." When these appear, then is the icebreaker's opportunity to push ahead with vigour, and make as much progress as possible before the ice again closes up.

When we made our first passage through the ice in the "Sviatogor," we knew little or nothing of the peculiar ice conditions in the White Sea, with the result that our vessel almost came to grief. The "Sviatogor" was a singularly fine specimen of her kind. Completed by Messrs. Armstrong, Whitworth & Co. of Newcastle-on-Tyne in 1917, she was the very last word in icebreaking craft and the largest icebreaker in the world. Her length was 323 feet and beam 71 feet, and displacement 10,000 tons. Her machinery consisted of three similar sets of triple expansion engines of 10,000 horse-power, which occupied practically the whole length of the vessel. The propeller shafts and propellers were of the finest nickel steel, and the strength of the whole propelling machinery was greatly in excess of normal requirements in order to withstand the shock of the engines being brought up suddenly through the propellers becoming embedded in block ice. To reduce skin friction against the ice, and to protect the vessel's sides, a broad steel ice-belt, 7 feet deep by 1½ inches thick, encircled the hull at the water line. In addition to this the ship had what amounted to double side and bottom plating throughout, since wing coal bunkers and water ballast trimming tanks reached from the turn of the bilge to the upper deck fore and aft.

We had no records of the vessel's past performances whilst she was in the hands of the Russians, nor any other intimate details about her, for these had been destroyed when the vessel was seized by the Bolsheviks and temporarily submerged in the main channel near the mouth of the

River Dvina in a futile attempt to prevent the allied occupation of Archangel. We therefore had to discover from actual experience what she was capable of doing. She proved to be at her best in smooth, unbroken field ice, through which, rising and falling in the manner of an army field tank in action, she would plough with comparative ease, shattering the ice into thousands of fragments. When the icefloes were too plastic to crumble readily under her great weight they would split and open up into lanes, as she forced herself, wedgewise, into them. When the ice was packing heavily, however, there was nothing to do but bank fires and await a more favourable opportunity. This was a lesson we learnt during that first trip to which I have referred, only after we had expended half our coal in a fruitless endeavour. We had been detailed to escort to Archangel a Russian vessel, named the "Bonaventure," which was laden with supplies for the front. It was early February, and the ice was freezing hard, with a temperature of twenty degrees below zero. At the entrance into the White Sea the ice consisted of an extensive belt of smooth field-ice about three feet thick. This was entirely to the "Sviatogor's" liking, and during the first twenty-four hours of ploughing through it we led our charge along at a rate of three miles per hour. As we penetrated further into the Gorlo, however, the ice became heaped up and hummocky with the result that our second day's run dropped to twenty-nine miles. The third day's run was six miles; the fourth day's four miles; on the fifth day, despite hours of strenuous endeavour, involving much wear and tear to the engines and the consumption of over a hundred tons of coal, we actually lost ground. By the time we had been a week in the ice we had covered only ninety of the hundred and eighty miles which was the distance from the entrance of the White Sea to Archangel; two-thirds of our coal was gone.

At this stage the Admiral dispatched the "Alexander," which was at Murmansk, to our assistance, instructing us by wireless to return at once; in a second message to Archangel he ordered the "Kniaz-Pogarski" to proceed North and take charge of the "Bonaventure." Having learnt that it was futile to try to drive through the Gorlo by sheer brute strength, we carefully conserved our coal on the return passage, banking fires when the ice was packing and only raising steam at times of slack water. For days we remained in much the same place, drifting up and down the coast with alternate tidal streams, closely beset the while by hummocks and pressure ridges and heaped-up drifts of snow, which latter were the bane of our lives. The sea and landscapes were monotonous in the extreme—just a huge expanse of white snow and ice, only relieved by fishermen's huts scattered along the foreshore, but abandoned for the winter. To the northward, the "Alexander" was in much the same plight. She, too, was learning her first lesson in icebreaking, and

by the time she finally reached us we had succeeded, with the aid of a strong westerly breeze, in extricating ourselves from our precarious position. We reached the harbour of Yukanskie, just beyond the limit of the icefields, where a collier was awaiting us, with only twenty tons of coal in our bunkers!

When we arrived back at Murmansk we found everyone there intensely interested in a commonplace tramp steamer, "War Down" by name, which had just arrived. She was laden with munitions of war, which included a large consignment of shells that were urgently needed at the front. The "Cosma-Menin" and "Olga"—the latter an icebreaker which had just arrived at the port—were being hastily coaled in readiness for conducting the freighter through the ice; and no sooner had we dropped anchor than a collier tied up alongside us as well. The Admiral had decided to use all three icebreakers to get the "War Down" through; he had also instructed the "Kniaz-Pogarski" and "Alexander" to be ready at Archangel to work up to the northward and assist the convoy, if needed. By then the "Kniaz-Pogarski," subsequently assisted by the "Alexander," had succeeded in getting the "Bonaventure" through the ice.

On the 13th March, accompanied by the three above-mentioned icebreakers, the "War Down" left Murmansk, the "Sviatogor" being in charge of the operations. Reaching the edge of the ice at midnight the following day the icebreakers brought their searchlights into play in the hope of finding a suitable "lead." No clear water was seen, however, so we decided to force our charge into the unbroken field of ice, which stretched out ahead as far as the eye could see. As the "Cosma-Menin's" Russian captain had an intimate knowledge of White Sea ice conditions, he was instructed to take the lead and pick out a suitable track, while we in the "Sviatogor" followed closely in his wake, widening with our greater beam the lane his vessel made. "War Down" was to follow close astern of us, and "Olga" astern of her. The latter's task was to sweep up alongside the "War Down" and brush the ice from her sides. While the ice was smooth and unbroken this plan worked admirably, but as soon as we encountered the pack ice our lane of water closed up almost as soon as it was made, constantly bringing the "War Down" to a standstill. When that happened, before she could be got under way again, the freighter had to be "broken out." These "breaking out" manœuvres were exasperating and nerve-racking to a degree. They had to be performed with the engines working at full power, ahead and astern alternately. They involved constant risk of collision, as to do any good the icebreaker had to steam up and down within a few feet of the escorted vessel in such a manner as to brush the ice away from her. Sometimes they took an hour to execute,

and often enough the vessel had no sooner been freed and got on the move than she stuck again. In the "War Down's" case these manœuvres became so constant that, in order to conserve our coal, we decided to bank fires and trust to a north-easterly gale that was blowing to sweep us through the Gorlo.

By the 18th March, five days after leaving Murmansk, we had drifted to within five miles of Sosnovetz Island, which lies midway through the Gorlo, on the Terski Coast. Confidently expecting to drift safely past this island, we were perturbed to find ourselves drifting straight towards it. It loomed up ahead larger and larger, but its compass bearing never altered. Realizing the necessity of leading the "War Down" seaward without delay, we hoisted the signal for vessels to raise steam. This was always kept at short notice, and within an hour we all had a full head of steam on our boilers; but so firmly had we become wedged in the ice that we could not move, even with the engines working ahead and astern at full power. It seemed as though nothing could save us all from disaster when, to our great relief, we noticed that the island was encircled by a fringe of stationary land ice, which was diverting the drifting floes and causing great upheaval among them. This fringe saved us from the rocks when we were but a stone's throw from them, for the "War Down," the "Olga" and our own vessel became firmly cushioned on it; the "Cosma-Menin" continued to drift round its edge, and was soon lost to view behind the island. Subsequently she signalled us, saying that she was still held fast in the ice but drifting safely.

While cushioned on our fringe of land ice we were surprised in the "Sviatogor" to see two people coming across the ice on ski towards us. These turned out to be the island's lighthouse keeper and his wife, good folk who, in their lonely desolated retreat, kept the light flashing throughout the long, dark winter months. Needless to say we gave our visitors a warm welcome, and as much in the way of stores and household comforts as they were able to carry back. One of our officers late of the Russian Imperial Navy acted as interpreter, and through him our visitors warned us that the ice on which we were cushioned would break away from the shore as soon as the tide changed; they expressed the opinion that we would then drift seaward to safety. We asked them to stay awhile and have a meal with us; but they said they had already stayed too long, and that unless they hurried back to the island they would never reach it. Their fear was well founded, for hardly had they regained the shore than the ice began to break up, and a few moments later we were drifting seaward as our friends had predicted.

That night there was considerable loosening of the pack. Taking advantage of this we broke out the "War Down" and proceeded on

our way, being rejoined by our colleague, the "Cosma-Menin." In the early morning of the 18th, while we were lying with fires banked, since the ice had closed up again, there was a considerable pressure, which lasted for over an hour. I was awakened by it, for the ice made a great noise, grinding and groaning against the ship's sides. Instinctively feeling that we were in for trouble I got up and dressed. A few moments later we received a message from the "War Down," stating that she was buckling under the strain, and making water in her holds and engine room; her captain concluded by saying that he feared the consequences of the next crush of ice. Having raised steam quickly, the "Cosma-Menin" and the "Sviatogor" manoeuvred into position close ahead and close astern of the damaged vessel; then, until the ice pressure eased, they steamed to and fro across her stem and stern, in such a manner to crack the floes squeezing in on her. Later, in company with the "Sviatogor's" chief and second engineers, I boarded her to inspect the damage. We could not get down into the holds, which were full of cargo, nor into the forepeak, which had become flooded; but in the engine room at the level of the water line we found several frames and a few plates badly set in; from the leaky rivets in these a steady stream of water was trickling down the ship's side.

The "War Down's" captain was not in favour of continuing the voyage, and subsequently, at a conference in the "Sviatogor," attended by the commanders of the two other icebreakers, he formally protested, in writing, against doing so. My captain accepted this protest, without being impressed by it. His orders were to get the "War Down" through at all cost, he explained; come what may we would, therefore, have to carry on, even though the vessel were lost in the attempt. Realizing that it was a case of the exigencies of war, the "War Down's" captain promised to continue to do his best with his vessel, a promise which he faithfully fulfilled.

A heavy fall of snow put further work out of the question that day and the next; the ships might just as well have tried to drive through a sea of cotton wool as through it. We banked fires and let them drift up and down the Gorlo, with the alternating tidal streams. At midnight on the 19th we experienced another ice pressure, which caused the ice to pile up to a height of six feet along our sides. This brought another urgent message from the "War Down," telling us that her sides had been set in still more, and that her decks were lifting under the strain. The message concluded: "Fear ship will be lost if you continue to force her through the ice." Raising steam again we stood by her, trying to ease the pressure against her as before. But for the fact that she was a brand new vessel I do not think she would have stood the ordeal.

As the result of continual buffeting into heavy floes her stem was twisted round almost at right angles, and there was a hole in her bow big enough to take a handcart. Her forepeak being completely flooded, there was danger of the collision bulkhead collapsing at any moment. Nor was that all; at dawn next day, when we resumed work to take advantage of some "leads" that had opened up, it was discovered that she could not move her engines because her propeller shaft was bent. The "Cosma-Menin" was, therefore, instructed to take her in tow, while we went ahead and broke a channel. For hours on end we struggled with the ice, charging it at full speed until brought to a standstill; then we would back out of our furrow and charge at it again. Difficult as it was for us, it was infinitely more difficult for the "Cosma-Menin" to drag the "War Down" along in her wake. It was impossible to keep anything like an even strain on the towing wire, which repeatedly carried away, necessitating a fresh length of wire being attached to the "War Down's" cable. In the midst of these troubles we received a message from the "Olga," which had dropped astern, informing us that she could not move as her propellers had become embedded in a huge block of ice, and asking us to go back and assist her. We left her to extricate herself as best she could. It took her twenty-four hours to do this, and it was thirty-six hours before she rejoined the convoy.

Meanwhile, the "Kniaz-Pogarski" and the "Alexander," which had been dispatched from Archangel three or four days earlier, were slowly closing us from the southward. During the night of the 20th we sighted their searchlights flashing as they picked out a track through the ice. The "Alexander," with a thousand tons less displacement than the "Sviatogor," was the second largest icebreaker afloat. Unlike the larger vessel, which was built to crush through the ice by sheer weight, she was designed to defeat it by more subtle means. Instead of triple screws at the stern, as was the case with the "Sviatogor," she had twin screws at the stern and one at the bow. The main object of this bow screw was to suck the water from under the floes, rendering them more liable to crumble; its second function was to sweep away loose ice from the ship's sides with its wash. Whether results would have justified this arrangement or not cannot be said, for she came to grief early in the operations. While working up from Archangel to our assistance, in company with the "Kniaz-Pogarski," she got in too close to the land, which was often indistinguishable from the sea, and struck a rock. Though subsequently put out of commission as the result of this accident, she managed on that occasion to carry on, and at midnight on 21st March she took charge of the convoy, permitting us to return to our base.

Our struggle northwards to open water was a wearisome, monotonous business. Most of the time we lay with fires banked, only raising steam

and resuming work when slack water opened up leads. To while away the time we organized football matches and seal hunts on the ice. Occasionally we received visits from the Laplanders, who came out to us from the shore to beg tobacco and matches. In return for these they showed our men how to skin seals, of which beasts the ship fairly stank. Some of the bluejackets spent hours curing these skins, hoping to sell them ashore. They were disappointed when they learnt that the seals in the White Sea are quite valueless. From the time we left the convoy seventeen days elapsed before we finally worked ourselves out of the ice. We had been twenty-seven days in it, covering a distance of a hundred and eighty miles, which took us halfway through the Gorlo and back again.

Meanwhile the four icebreakers, "Kniaz Pogarski," "Cosma Menin," "Olga" and "Alexander," continued to struggle on with their charge. First one would try towing her, then another. As an alternative to normal practice they tried towing her stern first. At that stage their principal concern was to keep her afloat; her bow had become battered out of all recognition, and the collision bulkhead was bulging. In the engine room and holds she was making water so rapidly that the pumps had to be kept going continually. When reports of her condition filtered through to Murmansk and Archangel, the Bolshevik sympathizers in those ports rubbed their hands, while the unemployed Russian sea captains loudly declared that she was bound to be lost, for they were irritated by our presumption in trying to do what had never been done before, that is to say to pass a vessel through the White Sea in mid-winter. But, in the end, the "War Down" confounded the lot of them. Blessed with the true Briton's fighting spirit those on board her stuck it out to the last, and actually succeeded in getting the vessel's tottering engines on the move again. On 31st March she reached her destination, with her cargo intact. It had taken the combined efforts of five icebreakers to get her through; two of them the largest, latest and finest vessels of their kind in the world. The passage through the ice had taken seventeen days, and the average rate of progress was ten and a half miles per day.

It is obvious, therefore, that however meritorious a performance this may have been in time of war, attempts to keep the White Sea open to navigation throughout the winter can scarcely be regarded as a commercial proposition.

(To be concluded).

MILITARY UMPIRING

By COLONEL C. G. S. HARVEY, D.S.O.

THE following notes on umpiring, the result of two training seasons spent as Senior Umpire to the 2nd Division, should be considered in conjunction with the duties of umpires as laid down in Training and Manceuvre Regulations and any special instructions issued by command or divisional headquarters.

The policy advocated by the General Staff now is that as many officers as possible should be given an opportunity of acting as umpires during the training season. On the other hand, the writer's own experience leads him to the opinion that the best results in umpiring are obtained when umpires are changed as infrequently as possible.

(1) *Training of Umpires.*—To obtain good umpiring it is essential that the unit umpires should be well trained. This is the duty of the senior divisional and brigade umpires. Accordingly, before the commencement of battalion training, the senior divisional umpire should call a meeting of brigade umpires and lay down the system of training of umpires, and discuss any points brought forward by the brigade umpires. This will ensure that all the umpires in the division work on the same lines.

As soon as battalion training has commenced the divisional umpire and the brigade umpires should attend the battalion exercises and watch the work of the battalion umpires. They will then be able to gauge the capabilities of the unit umpires and correct any faults. It may be found that a unit umpire is not suitable, in which case he will have to be changed.

During brigade and divisional training the senior umpires have very little time to supervise the junior umpires, and must stand or fall by their work.

Umpiring is essentially "team work" and, therefore, the members of the team should, if possible, not be changed. In addition, to enable divisional and brigade umpires to carry out their duties satisfactorily, they should be provided with a motor car as well as horses from the commencement of battalion training. During divisional training they

should have drivers for cars, since it is impossible for them to drive their own cars, as an enforced delay due to breakdown or puncture may very seriously interfere with their work.

(2) *Duties of Senior Umpire.*

1. He is responsible for the training of all the umpires in his division.

2. Before an exercise he must obtain from the Directing Staff their views as to how the exercise is to be umpired.

(a) He must find out if the exercise is to be (i) "directed," in order to bring out certain lessons or to cause certain situations to be brought about by prearranged umpiring at definite places and times; or (ii) if the commanders are to be given a free hand, i.e., is the exercise to be umpired as it would occur in war.

(b) He should ascertain, if he can, the views of the Directing Staff as to the probable course of the operations.

3. He should call a meeting of senior umpires. This meeting should be attended by all such umpires working with artillery, infantry brigades, cavalry, tanks and R.A.F.

It is suggested that if the exercise starts in the morning, this meeting should be held the day before, and if the exercise starts in the afternoon it should be held that morning. This procedure will enable brigade umpires to hold their own conferences just before the exercise starts.

At this meeting the Senior Umpire will issue and explain :—

(a) The scheme, bringing out any points given him by the Directing Staff;

(b) The location of his Report Centre and probable position if it is moved;

(c) The hours at which he requires the narratives to be sent in;

(d) The necessity of précis of orders being sent in at once;

(e) The numbers of copies of orders he requires;

(f) The allotment of liaison officers and neutral despatch riders;

(g) Whether the markings, to distinguish planes, tanks and armoured cars, etc., of the different forces are clearly understood.

He should then arrange for a conference of senior umpires at the conclusion of the exercise. It is usually best for the umpires to come to the Report Centre as soon as they have collected the last information from their unit umpires. The Senior Umpire will then find out if all

his instructions are perfectly clear, and ask the senior umpires if they have any points to raise.

4. During the exercise the Senior Umpire is responsible for ensuring that all the information he receives is given without delay to the Directing Staff, together with copies of all orders and messages.

In order to obtain early information he must get from the senior and brigade umpires a précis of any order that is issued, as, in large formations, it may take two or three hours to make out an operation order after the commander has given his verbal orders. It is essential that the Directing Staff be informed as soon as possible of a commander's intention, therefore the précis must be made at the verbal conference and sent in as quickly as possible.

5. During operations he should visit the headquarters of the force when convenient, and if possible go forward when any "big battle" is to take place.

When he leaves the Report Centre his assistant must remain there.

(3) *Duties of a Brigade Umpire.*

1. He is responsible for the training of all junior umpires in his brigade.

2. Before an exercise he should hold a conference of all his umpires, explain the scheme and any points given him by the Divisional Umpire.

3. He must have an assistant brigade umpire, who should keep the narrative and who will act for him when he is away. The Brigade Umpire or his assistant must always be at brigade headquarters.

4. He is responsible for seeing that a précis of all orders is made out and sent off to the Divisional Umpire as soon as possible.

5. He is responsible for seeing that the narrative is sent in at the times ordered.

6. He is responsible for arranging that the required number of copies of orders are sent to the Divisional Umpire.

7. He should get in touch with his opposite number and should visit the Report Centre when convenient.

8. When all the units of a brigade are not engaged, he must make arrangements, if he considers it necessary, to use a proportion of the umpires of the units in reserve, to help the umpires with the forward units.

9. In order to facilitate the work of the Narrative Officer it is of great help if the brigade umpires and umpires of similar formations all

use the same *pro forma* for compiling the umpire's narrative. A specimen of the *pro forma* used in the 2nd Division is given below:—

NAME OF UNIT.

UMPIRES' NARRATIVE.

<i>Time.</i>	<i>Situation.</i>	<i>Subsequent Developments.</i>	<i>Remarks.</i>
--------------	-------------------	-------------------------------------	-----------------

(4) *Junior Umpires.*—The qualities and duties required of Junior Umpires are very clearly laid down in Training and Manœuvre Regulations. Provided that they possess these qualities and carry out the duties laid down, the umpiring should be entirely successful; but in practice Junior Umpires have not always been found perfect in the following details:—

1. Junior Umpires are not always strictly impartial. The system of allowing umpires to umpire with their own units has this disadvantage, but the domestic difficulties of sending umpires to work with other units are great.

2. Unit umpires must be well forward and must get in touch with the umpires of all arms of the other side.

It is not sufficient for them to ride along with the leading company, they must be well forward and find out the dispositions of the other side, so that when the troops come in contact, the umpires of both sides should have already made up their minds as to the decision to be given.

3. Junior Umpires must realize that they are not only umpires for the unit or arm with which they are working. They must be prepared to give decisions for the action of any arm that is in their vicinity.

4. Decisions must be given quickly and clearly, and umpires must see that they are carried out.

5. Opposing troops should never be allowed to come into actual contact. The distance they should be kept apart depends upon the ground, but when the situation is to be stabilized it should not be less than 150 to 200 yards. In the case of a break through, as soon as the attackers have arrived nearly on the position, the umpire should make the defender's casualties. This will avoid "dog fights."

6. One umpire per unit should be at the unit headquarters so that he can at once inform the Brigade Umpire of any orders issued by the unit commander. The present allotment of umpires is only two per infantry battalion. It is considered that to carry out the umpiring in a satisfactory manner it is essential that there should be three per battalion.

(5) *Umpire Report Centre.*

1. A central Umpire Report Centre should comply with as many of the following conditions as possible :—

- (a) It must be with or in very close proximity to the Directing Staff ;
- (b) It should be in a house, hut or tent, so that the officers keeping up the narratives and situation map can work in comparative comfort ;
- (c) It should be on the 'phone and on a road ;
- (d) It should be sited so that it will be as near as possible to the centre of the area of operations ;
- (e) It must be well lighted for night work ;
- (f) Direction pointers, to guide despatch riders and others to the Report Centre, must be put up where necessary.

2. The organization of a Report Centre should be as follows :—

Officers.—1, Senior Umpire ; 2, Assistant to Senior Umpire ; 3, Narrative Officer ; 4, Officer checking R.A. reports, who is also in charge of the situation map ; 5, Officer who receives all 'phone messages. Total : 5 officers.

When necessary for rest, etc., 1 and 2 can relieve each other, and similarly 3, 4, 5. There should be 4 motor cars for these 5 officers.

The above are required for the Report Centre of one side ; if both sides are located at the same Report Centre (which is most desirable) the above numbers must be doubled.

3. At least three despatch riders for each side are required ; these should be formed into a pool so that necessary extra despatch riders may be sent out for the use of formation umpires.

Arrangements have to be made so that the despatch riders obtain the necessary food and rest ; it is suggested that the officer in charge of the situation map should be responsible for this.

4. When operations are continuous arrangements must be made to enable officers to obtain necessary food and rest.

5. The following stores are required for a Central Report Centre when the Senior Umpires of both sides are located at the same place :—4 6-ft. tables ; 2 small tables ; 12 chairs ; 2 telephones ; envelopes ; paper ; paper clips ; drawing pins ; flags ; clips for messages ; chinagraph pencils ; pencils ; large sheet of talc ; pens ; ink ; message pads and carbon paper ; large sheet of cork for use with situation map ; large " butterfly " box for copies of orders, messages, etc. ; blotting paper.

(6) *Duties of Narrative Officer.*

- (a) Receive all messages including those taken by telephone officers, verify that the correct number of copies of operation orders come in; despatch one copy of operation orders or message to the Directing Staff; show the Senior Umpire or his assistant all orders and messages received;
- (b) Mark important items on all situation reports and messages;
- (c) About every two hours compile the narrative from the information received (if important items have been previously marked up this work is much easier);
- (d) As soon as he is satisfied that the information to hand is correct and the narrative compiled, he will hand it either to the Directing Staff or to the central Narrative Officer—if there is one.

(7) *Duties of Telephone Officer.*

- (a) He receives all 'phone messages, taking two copies of each and hands them to the Narrative Officer;
- (b) The name of the umpire sending the message must be known, as well as the time of the situation reported by that umpire. (The time of despatch and receipt of the message are of little value).

Important Notes.

1. Either the Senior Umpire or his assistant should always remain at the Report Centre.
2. The establishment of a separate place where press and spectators can obtain information is most necessary, otherwise the work of the umpires is constantly being interfered with.

THE FUTURE OF AEROPLANE DESIGN FOR THE SERVICES

By C. R. FAIREY, Esq., M.B.E., F.R.Ae.S.

On Wednesday, 11th February, 1931.

AIR VICE-MARSHAL H. C. T. DOWDING, C.B., C.M.G., in the Chair.

THE CHAIRMAN introduced the Lecturer.

LECTURE.

THE title given to this Lecture may appear somewhat misleading when it is seen that I do not propose to indulge in prophecy as to the future of the aeroplane but rather to discuss certain questions affecting the development of military aircraft from the designer's point of view.

Fighting apparatus of all kinds is never anything more than a compromise between military requirements and the material possibility of the mechanism. Moreover, engineers or those intimately concerned with the development of aircraft are not always in the best position to utter prophecies for the future. The practical man is too close to the everyday difficulties of development to allow his imagination to run freely into the future however attractive that may be as a pastime. The journalist, the imaginative writer of fiction and the ordinary optimist can paint futurist pictures of possibilities, sometimes surprisingly correct but usually the reverse. Meanwhile someone has to do the work of development, and that person will have far more respect for the difficulties to be overcome before the gap between prophecy and achievement can be bridged. Therefore, I think it would be more useful to examine the various conditions which must affect the evolution of military aircraft, and if any prophecy of the future is indulged in, to do so only subject to the many reservations that arise in consideration of the various external conditions affecting that development.

Apart from any military considerations the aeroplane itself is a compromise. Its application to fighting purposes involves yet another compromise, as practically every feature added for military reasons tends to limit its flying capacity, and nearly everything the designer does to improve the flying of the machine tends to limit its military

usefulness. In all countries in which aircraft are manufactured a system of one kind or another has been evolved by which a balance is struck between the two tendencies, permitting or restricting the development of the apparatus as a whole. It is on the success of this liaison and the co-operation between the authorities and the manufacturer that the development of the fighting aeroplane most depends, and it may be assumed from the technical precedence which this country at present enjoys that for the time being at least our system is working quite well, and that the military and technical sides are co-operating successfully. It is interesting to consider the evolution of this present system, while the fact that so many methods resulting in the present success have been tried is a testimonial to the elasticity of mind that has been brought to bear on the problem.

Twenty years ago or less aeroplanes merely flew, without even sufficient equipment to fly them properly, much less navigate them with any safety, nor were they capable of the slightest defensive or aggressive action either against other aircraft or the ground. The first naval and military experiments were made with then existing machines merely purchased and examined as to their possibilities. The actual carrying of the first bombs, guns, wireless and other equipment was purely exploratory and without any certainty as to how such apparatus was to be used.

In this country co-operation between the Services and the manufacturer was started at the two extremes of method by the Navy and the Army. In the year 1912 I was associated with Messrs. Short Brothers, who were mainly supported by orders from the Admiralty. Generally speaking the method adopted in the days, when Admiral Murray Sueter ruled the Air Department of the Admiralty, was to buy from us, and others, such machines as we could supply, measure as far as possible what they were capable of, add something to the requirements and then try again to see the result. Under this system the first gun, the first wireless set and even the first torpedo were all carried. Two machines were actually built as gun carriers and other types modified for gun and torpedo work, and up to the time of the outbreak of war in 1914 a good and workable system of relationship between manufacturer and the Services had been established.

I have examined with interest a specification for four hydro-aeroplanes issued by the Admiralty to Messrs. Short Brothers and dated 14th April, 1914. It is interesting to note that although the flying stresses were specified the safety factor was not. That had to be worked out by the manufacturer. There were a few conditions relating to flying wires and the question of their corrosion, also some require-

ments as to the buoyancy of the floats. The propeller was to be metal-sheathed to protect it from the water, and certain drawings and particulars had to be supplied. For performance, fuel for five hours flight was asked for, plus a pilot and passenger at a combined weight of 350 lbs. It had to be fitted with wireless telegraphy, and that was the extent of the requirements. Everything else was left to the designer. In those times the liaison was purely personal as between the heads of the Air Department and the firms. Officers appointed to the Air Department from the Services used to visit the firms themselves, and by personal contact and discussion the various items of apparatus were installed to the best of our joint ability; they were subsequently tested by the Service pilots.

This policy on the part of the Admiralty certainly gave great stimulus to the industry and, thanks to their support of private enterprise, there were available effective designs of machines at the outbreak of war. The three or four firms who formed the nucleus of the industry and played so great a part in the war productions owed their existence very tested largely to the Air Department of the Admiralty.

The War Office, on the other hand, took exactly the opposite line, and endeavoured to concentrate the design, if not the manufacture, of aircraft entirely into its own hands at the Royal Aircraft Factory, Farnborough. The idea was that all design work for the Army should be carried out there, and that machines should be built from official drawings by firms in the industry, assuming one existed, which would not be likely under such conditions. Under this system were developed the well-known B.E. and F.E. types. The system failed, and in the light of modern knowledge of aircraft production that failure was inevitable. In the first case the designs were inferior to the private ones produced under the auspices of the Admiralty, and under war conditions the manufacturing results were disappointing. Aircraft, especially in those days, needed very frequent and rapid modification, and the system proved incapable of coping with the difficulties that inevitably arose. During the war most new designs were suggested to the authorities by private firms, as in the case of the Sopwith and Bristol Scouts, the $1\frac{1}{2}$ Strutter and many others, including the famous D.H. series; no specifications were evolved until after the machine had been put into use. I asked Captain Geoffrey de Havilland for the original specification for the D.H.4, and received the not unexpected reply that no such thing had ever existed.

Experience was being accumulated at an enormous rate, new military requirements were formulated rapidly, designs were evolved in order to meet urgent demands from the fighting front and often modified to

cope with production difficulties. There was little time for laboriously prepared specifications. Meanwhile a large official organization was being built up to assist in the problems of supply, and although standardization as far as possible was desirable, this obviously could not be allowed to stand in the way of the application of new ideas which would give a quick return in performance.

With the end of the war and the slackening off of the urgent demand for higher performance, the large technical staff was released for the work of consolidating the development so far attained. In aiming at greater reliability and range of usefulness of existing types the official organization became, I think, less flexible, to the discouragement of new ideas. All the technical experience accumulated in the war became concentrated into somewhat rigid ideas about every item of equipment and construction, there was little or no allowance for improvement which might be possible by changes from accepted practice. It was now possible to prepare elaborate specifications in which this accepted practice was laid down in great detail by the several specialists. The prescribed requirements affected not only equipment but structure, engine installation, cooling systems, in fact nearly every detail of the machine. In the fixing of detail within such narrow limits the cumulative effect on a complete design was largely lost sight of. There was in fact little left for the designer to do but to arrange the lift and control surfaces. With the restriction of his influence there arose a carelessness in regard to parasite resistance that had a very detrimental effect on design. Navigation lights, wind-driven dynamos, wing tip flare fittings, bomb gears, etc., were allowed to cause unnecessarily high resistance; even the petrol tanks emerged from the fuselage to rest on the upper plane, as the only alternative to the rubber-coated tanks then considered essential.

Specifications became truly formidable affairs. Petrol systems, for example, were defined to the extent of half a page, with the idea apparently of creating as many alternative ways of feeding the fuel to the carburettors as possible in anticipation of the certainty of breakdown on one or more routes; more petrol was circulating round the aeroplane than was reaching the engine. Every component aimed at perfection to the detriment of the machine as a whole. Finally from the sketchy outline of the pre-war specification, Air Ministry requirements in the early post-war period became altogether too elaborate and, in my opinion, tied up design to an unnecessary and harmful extent. It may be interesting in order to gauge the result of this policy to compare the development of the most popular class of machine—the two-seater general purpose day-bomber type.

This class developed during the war from the D.H.4 and the D.H.9, which were private enterprise aeroplanes adapted to bombing, and modified in the D.H.9a to carry a greater load and to suit engine production, the last becoming the standard type after the war. In 1921 a specification was issued for an aircraft to replace the D.H.9a and carry rather more military load. Although the new type was to embody all the experience of the war and of the next few years, the specification issued by the Air Ministry asked for a speed of some 6 m.p.h. less than the existing type. It is interesting to look at the machine known as the "Fawn" resulting from this specification, and to compare it with the D.H.9a. Since the machine was roughly the same size and power, it would appear extraordinary that an actual reduction in speed would be tolerated. The position could hardly be called satisfactory from the point of view either of the Service or of the aircraft manufacturer. The net result of the drawing up of this aircraft specification and of ineffective co-operation with the designer resulted in an inferior machine, after five years and much expenditure of money.¹

The "Fawn" could not be said to be a satisfactory type of machine. As far as wing design went its proportions were identical with the much more successful present day III.F. type, but the body and parasite resistance were such as to give it a very poor performance and spoil all the qualities that go to make a good aeroplane. I do not, of course, suggest that the fault was entirely due to the specification or to the state that the liaison system had then reached. A designer truly appreciative of the result that would be forthcoming, and with foreknowledge of the consequences of so much added resistance, should presumably have made himself heard more effectively in the early stages, and so cannot free himself of a large share of the responsibility. Nevertheless, the failure was there; it had to be faced, and so it was decided to take the Fawn specification as representing the staff requirements for the time being and to build a type to those requirements exactly from the designer's point of view without any restrictions other than those that common sense dictated, and since no British engine was available I acquired an American one of the required size and performance, and produced the original "Fox."

Perhaps in this case the designer had too much his own way and the pendulum swung too far, but I want you to observe the comparison of the two types, one of which is the result of the departments having too much their own way, and the other the reaction of the designer

¹ I apologise for using as examples aircraft of my own type. I hope it will be appreciated that these are the machines of which I have the most technical data and facts as to their development.

to the same military requirement. The "Fox" represented the designer's own ideas of roughly the same type of machine as the "Fawn," but such was its departure in performance as to establish a new type, the high-performance day-bomber, which carried in all the essentials practically the same load as had originally been attempted in the "Fawn." The reduction of parasite resistance, the complete swing over in principle to the designer's outlook on the main lay-out, set up a two-seater standard higher than the contemporary single-seater on all points, and it would appear from subsequent policy that the change was worth while. In fact, when the replacement specification came to be issued in August, 1926, practically every feature of the original "Fox" was maintained, and we now see a new type of specification which has produced some highly successful machines and which is a marked swing back from the highly restricted one of five years before.

The first of the main requirements is now stated to be high performance—the last of the four is stated to be capacity for self-defence. Presumably a high performance was considered to be the greatest asset in the way of defence and better than the cramping of speed by the undue projection of guns or armament or arrangement of the machine to provide the gunner with abnormal firing range, but there also appears a clause such as had never been seen before in any Government specification, as follows:—"The special requirements set out in paragraph 7 are to be regarded as ideal (these refer to the arrangement of crew, armament and equipment). They need not be rigidly adhered to at the expense of performance of the aircraft. If the design-work shows that the aircraft could be made to fulfil the duties set out more efficiently by departing in some respect from the specification a proposal to do so should be submitted to the Director of Technical Development for consideration." Moreover, in this specification are to be noted many improvements over the previous attitude. The long and exacting requirements for the cooling system have disappeared, so have those for the petrol system. The petrol tanks may now obviously be inside the fuselage and of any suitable material. The military load to be carried is almost identical with that of the original "Fox," and many items of equipment of the older specification have disappeared. A top speed of 180 m.p.h. is specified, while the alighting speed is put up to 68 m.p.h. The equipment is now much more reasonable and occupies less than a page of the specification.

This specification may, in fact, be taken as the modern standard, and represents a very fair equipoise between the two points of view, and is, moreover, very elastic and capable of easy compromise on points of difficulty. Under the present system a vast improvement in the

types of aircraft being provided for the Service may now be seen, and as this system has been the subject of many changes in the past it may be as well to comment here on some of the further stages by which a machine is produced to a specification and progresses toward becoming a standard Service type.

Liaison with the Service in the actual production of the type machine commences at the mock-up conference, when the mock-up is inspected by, and modified to suit, as many as twelve specialists, even for only a two- or three-seater machine. The contractor relies on the advice of these specialists in the general lay-out of the equipment and accommodation so as to produce a machine which will truly satisfy the Service requirements at the time it will become available for issue to the squadrons. Careful consideration of the mock-up is especially necessary in the case of machines required to fulfil a variety of purposes, as later on a modification which in itself may be only a minor change may have a serious effect on the complete arrangement. It is, of course, highly preferable that the subsequent inspections during the construction of the machine should be made by the same individuals. After the approval of the machine for flight and the manufacturer's trials, it passes into the charge of the official testing establishment—Martlesham or Felixstowe. Here it is subject to a very complete series of standard tests for air performance, and general handling carried out in a way which is recognized throughout the world as second to none. Criticism is made of the armament and equipment, standardized tests of its suitability from a maintenance point of view and general comments on its Service use are given. The reports on these tests give the manufacturer the most accurate possible measure of his product which is obtainable at that stage. The criticisms will to a very large extent indicate how correctly he has interpreted the military requirements of the specification. Frequently he will rely on the figures obtained for determining the effects of various changes in design which it would be impossible to show up with less highly developed methods.

The Service trials which follow after the machine has been reported upon by the Test Establishment form only a small part of the duties of the particular squadron, and are, therefore, less highly organized than the tests at the experimental establishments. Furthermore, the average experience of the pilots dealing with them is not likely to be so great, and the criticism of the machine as a future type may be based on too close adherence to existing methods in handling and general usage of the particular class.

This present system of co-operation between the Air Ministry and Royal Air Force on the one hand and the aircraft manufacturer and designer on the other, is working fairly well—judging by the latest

results and the technical precedence which is enjoyed by this country; but that is not to say that it is entirely satisfactory to the designer. There is still a tendency for specifications and special requirements and procedure to be too restrictive, and I consider that further simplification could be made with advantage.

I think all designers would like to see a specification somewhat on these lines:—

- (i) The Service duties of the aircraft with the equipment to be carried, but giving concessions that any existing items of equipment may be replaced by others capable of the same duties.
- (ii) The total load to be carried and the strength factors required.
- (iii) The minimum performance.
- (iv) A clear specification of items of arrangement where definite preferences occur such as the position of guns in the single-seater fighter, a decision with regard to prone as opposed to other positions for a bomber, and definite guidance given to the designer on the questions of defence or aggressive requirements of the aircraft.

Since types once established remain in service for a long time, I think we might now begin by permitting a new freedom from the old standards of instruments and equipment and take the opportunity of introducing new. It is high time that much of the existing Service equipment was scrapped and some new equipment was forthcoming. The aircraft of to-day is a very different apparatus from that of twenty years ago. But not so the machine-gun, and the stagnation of machine-gun design has left its mark very heavily on the design of fighting aircraft. The gun appears to be expected to jamb in many different ways, and these expectations so far approach a certainty that advance preparations must be made for clearing all sorts of jams under all kinds of conditions. Were the same attitude of mind adopted by the engine designer and his valve gear expected to jamb, aircraft would not be very useful for fighting purposes. It is a matter of the gravest astonishment to all aircraft designers that in this year 1931 a better machine-gun should not be forthcoming. To a lesser extent many other items of equipment are obsolescent, clumsy and unsuitable: even the standard flying instruments now used could well be improved upon.

Just as specification requirements restrict the designer, so to a large extent do they restrict the officers concerned with mock-up conferences and in general association with the designer on questions of detail or equipment. Here again I think there is room for improvement in new types, which are going to be less frequently forthcoming in the future than in the past, and are going to take longer in the process of evolution.

Of course, speed, climb and equipment are not the only respects in which aircraft are developing, nor are they the only ones destined to have an important bearing on military aircraft of the future. The question of mass production of aircraft in emergency is one of the highest importance, and I think that it is not generally appreciated how vast an effect the metallising of our aircraft is destined to have on the possibilities of production in the future. Metal aircraft are built in a very different manner to that in which were the wooden aircraft of the war. In manufacture in wood, joined by metal stampings, which was the method of construction of all war-time aircraft, the greatest flexibility of type and ease of modification could be attained. A factory that could build one type could build another—wood-working machinery is exactly the same and is affected little by size of the aircraft within the ordinary range. Jigs and tools were comparatively few except the press tools for the metal fittings. Spars, struts, longerons and other parts were merely cut out on wood-working machinery, and modifications made no difference to the plant employed.

With the coming of metal this has all changed. For metal production in quantity an aircraft must first be most elaborately tooled, not only as regards the pressing or shaping of fittings, but as regards nearly every operation in the process of manufacture. Parts must be elaborately jigged before they can be drilled or machined, limits must be far closer to make possible the assembly of parts without restricting interchangeability. Production machinery is now no longer universal in application but specialized to a few operations, and the tendency is for it to become even more so. It may surprise you to know that the cost of special tools for a single aircraft, that is to say the smaller works tools, made specially, one for each operation, may exceed the total cost of machinery laid down in the entire factory, if done on a sufficient scale to justify the statement that the machine is genuinely in production.

The first result of this is manifest: we are much more bound to a type once in production. Although the possession of those tools considerably augments a factory's capacity for output, it ties the factory down to those types and to those alone for which it has the tools and special equipment. It makes modification difficult and change of type impossible without great disorganization of output. In peace time this will hinder the introduction of new types very much on a question of cost. The tools are not all made in the first case but are built up, improved and elaborated as production continues. A machine is not generally completely tooled, if it is ever completely tooled in the full sense, until some hundreds have been made. By that time it has assumed to have overcome its "teething" troubles, and no more

structural modifications should be necessary. At the same time, the prices will have been falling as the cost of these tools is spread over the greater number of machines, and provided that the output is maintained and is continuous so that workpeople may become accustomed to their various operations and the bottle-necks in production discovered and remedied, production costs will fall to a point when the material and overhead costs become important parts of the total.

On the other hand, a new type even of the same size and all-round capacity, assuming it uses none of the tools or special appliances of the old machine, which is quite likely, would start off by costing at least double in the development stages the price of the machine that had been through production to the extent of a few hundred. In war time the effect will be different. A military staff before they could adopt a new type must face the fact that this adoption would for a time immensely decrease production. Remember it is the possession of the special tools and not the factory and general machinery and plant that make rapid production possible. Production cannot be spread to other factories until such time as these tools and appliances are duplicated, and that involves special difficulties of its own. The wooden aeroplanes of the late war were manufactured in furniture and car body factories, and almost anywhere where timber working plant existed. That stage is now passed and metal aircraft will only be able to be made in properly equipped factories. To compensate for this the parent firm's capacity is immensely increased by the possession of the tools, but it will not be so easy to make many types at one time, and change of type will involve very serious delays.

Therefore, it seems to me that this question is going to have a very big effect on the trend of future development. It is going to slow it up in one respect since there will have to be a large difference in performance and capacity of a machine before it is worth while changing a type, because a change will involve a greater cost for a time if taking place in peace time, or delays in output if taking place in war. This will encourage the method of bringing a new type much nearer to perfection before placing it in production so as to take fewer risks of subsequent modification. It will cause a tendency for much consideration to be taken before introducing a type at all and for much more time to be taken in the development stages of perfecting a new machine. One other effect metal production will have—small machines mean light machinery, cheaper tools, cheaper materials and altogether easier manufacturing conditions. The advantages of mass production methods are going to be much more applicable to little machines than to big ones. A lathe for turning, let us say, a 1-in. steel bar is cheaper, requires less space and power than a lathe for tackling, say, 2-in. Moreover, its

rate of output per part is very much higher, the lighter and smaller the press the more rapid the rate of output, and so with all machinery. Not the least important of the effects of metallising is the tendency to keep aircraft small, since a machine, however perfect, that cannot be produced in quantity is not likely to be of much utility in war.

These questions are just beginning to become manifest and will soon, I think, become of the greatest importance. The great change that has taken place in the aircraft industry in the past ten years is not yet generally realized, and except for the types already installed and in production, the output capacity of the industry is not nearly so great as it is imagined to be. For tooling and production types it is presumably higher than ever before. In capacity to put a new type in production the time, in my opinion, is roughly speaking trebled, if that type is to go into full production throughout in metal and be in a condition for rapid production in an emergency. Therefore, in the future we must look forward to less rapid development, or at least development by larger steps at longer intervals than in the past; to the continuance of the small machine, bigger ones being restricted to the special duties only, where size is a necessity; and to prolonged use of a type once in service and possibly the increasing of the functions of existing types of good design and already in production.

So that first in order of importance in their effects on the trend of future aircraft design comes, I think, the question of proper liaison between the authorities and the designer. From the experience of the past this would appear to be forthcoming, particularly if the officially approved designs are stimulated from time to time by competitive private enterprise. Next there must be an allowance for the restrictions that will be applied to the design by the necessity of large war outputs, and with these in view it may be possible to examine the natural limitations of the aeroplane to see what we may hope for in performance in the near future. One further reservation must be made—at any stage the aeroplane is dependent on the engine, and any prophecy of future development must keep within bounds of the best available engine because, if one is permitted to guess at future engine performance, almost any possible aircraft performance could be imagined. It is, of course, quite a simple matter to draw a few fantastic pictures, suggesting the most sensational development as being possible in the near future, but I think it is more interesting to look a little way forward strictly with regard to immediate technical possibilities.

One way of doing this is to look at the machines the designer produces when he has no restrictions whatever other than his own insufficient knowledge of natural laws and those imposed upon him by

materials and engine capacity. Accordingly, if we take the present world record-breakers, they may be assumed to represent the utmost the designer can do when unhampered by any other restrictions, and it may be interesting, as it were, to evolve these backwards, taking their existing performances and adding by stages the various practical or military requirements to see what the effect would be.

The best example is the S.6, the world's record-breaker for speed. It is capable of a speed exceeding 350 m.p.h.; it has a landing speed of about 100 m.p.h., coupled with a very flat attitude of approach, and is unsuitable for use on wheels for an ordinary military aerodrome. Its engine is a highly-boosted type, capable of only a few hours life when utilized at full power. For effective stream-lining the cooling is entirely by surface radiators, and the pilot's position cannot be said to fulfil even reasonable requirements for view or gunfire. Now let us consider the evolution of this type into a single-seater scout of the interceptor class, the great mass of the engine making the machine unsuitable, at least in manœuvring, for the ordinary fighter class.

Firstly, the engine power must be restricted in order to give reasonable freedom from the risk of failure in flight. We will assume it is possible to use 75 per cent. of the power now available, that is say, about 1,400 h.p. Next we must bring the landing speed down to a reasonable degree, assume 80 m.p.h. which, although high, is negotiable on most aerodromes. In order to obtain this figure the wing area must be increased roughly 90 sq. ft., for although we have saved in weight by the removal of the floats and the substitution of the wheels in the undercarriage, this extra area will itself add weight, so that the net gain is not large. Such a machine would attain a speed of 320 m.p.h. and a maximum rate of climb of 3,750 feet per minute, with a corresponding time of less than 7 minutes for a climb to 20,000 feet.

Then, since the fuselage shape is not the best possible for a fighting aircraft, we must raise the pilot's position to give him a better view for attack and also for landing. Provision must be made also for a greater capacity for fuel. These modifications involve an enlargement of the frontal area and a retrograde step in stream-lining, and the result is to deduct something like 20 m.p.h. in speed and 400 feet per minute in rate of climb. Next the two essential guns, the gun sight, the cartridge chutes, and one or two other matters involve us in a further increase of frontal area and more parasite resistance. Putting these effects at a minimum we should then arrive at a speed of 290 m.p.h. and a climb to 20,000 feet in under 8 minutes as an immediate possibility. Finally, if we were to add the wireless aerial and full equipment for the ordinary single-seater fighter specification, we should arrive at a machine having a speed of only 260 m.p.h. and a climb to 20,000 feet in 9 minutes.

It must not be assumed that I am putting this forward as a fighter design. The big span makes it altogether unsuitable for this purpose, and it lacks many features of a properly developed fighter. I am only using this method to indicate what type of performance might be expected if we had no restrictions whatever, and since, with less than half the horse power, machines are attaining speeds of over 200 m.p.h. with the interceptor load, it would appear that we are not doing so badly, and the balance between military requirements and designers' needs is being well kept for the time being. The difference between the performance of those interceptors and this machine is attributable almost entirely to the increased power, and if we could obtain 1,400 h.p., from the air-cooled engines of the present type fighter its speed would be in the order of 240 m.p.h. Therefore, it would appear that for the next stage in single-seater fighter design another increase in power is needed coupled with a decrease in weight per horse power.

So much for the speed type; now what would be the result of the same policy as applied to the long-range aeroplane, albeit not the record-breaker, but the only one of which I have sufficient technical knowledge to take for my comparison. This machine has a range of 5,500 miles. But the take-off conditions for this record-breaking long-range machine are so severe as to be quite impracticable for any Service operations. The first restriction on the design is a reduction of load sufficient to ease these conditions, say to allow a height of 50 feet to be reached at the end of an aerodrome 1,000 yards long.

We will now assume that we are content with the speed and other qualities of the machine and wish to evolve the longest possible range bomber for distance attack with a load of 500 lbs. of bombs. Allowing that these bombs could be housed in the wings, or otherwise enclosed so that no extra head resistance is involved, the machine could be expected to have a range of about 3,900 miles. As the next stage, provision must be made for self-defence. Adding a front gun and a rear gunner's cockpit and a certain amount of ammunition, but no extra crew as the navigator will attend to the defence and bombing, then the range must be assumed to have dropped to 3,300 miles.

By now it will be noted that we have seriously shortened the range but we have not quite finished. If wireless is to be carried, landing lights, navigation lights and so forth, if in short the full equipment of the heavy type day-bomber were added, we should then reach a stage by which the performance for this weight of bombs had been dropped to 3,100 miles at a cruising speed of 90 m.p.h., as compared with less than 1,000 miles and 100 m.p.h. for the contemporary bomber of its type. Moreover, its range would, of course, be further reduced if it were flown

at a service cruising speed much in excess of the most economical speed, and in fact in order to reach this figure all the usual operation methods of the Service would need to be subordinated to it, and only by skilful tuning and special maintenance of the engine, pilot's skill in the use of the mixture control, and the necessarily favourable conditions for the take-off could the range be attained.

These instances could be multiplied for many types, and give at least some indication of what is to be expected from, or rather what price is to be paid for, the addition of any weight or head resistance or other requirements on existing record breakers, and some idea can be gathered of the possibilities, at least for the near future.

No account is taken of the improvements to follow from progress in engine design, as all my assumptions have been made on existing engines. In addition, as a result of metallising aircraft construction and the fact that a working system of liaison has now been evolved, it is possible to estimate more or less the trend of design in any one type over the next few years.

There are only two ways in which an aeroplane may be made to go faster—we must increase the power or reduce the head resistance.

For increased power we must look to the engine designer, and every big step forward in aeroplane design has followed the evolution of a larger or new type engine, although certain types of machine have indicated very strongly what type of engine was required. The reduction in drag cannot go on indefinitely, and has already reached a stage when body shapes and wing sections must be so finely produced that a very small disturbance or parasite resistance added has a most serious effect.

Improvements in materials will give advantages in both aeroplane structures and particularly in engine power output. Improvements in efficiency of the engine will effect great economies in the fuel load carried. The inevitable arrival of the compression ignition engine will have a great effect on the capacity of the long-range aircraft, but none on the design of the light fighting machines. Improvements in equipment could do a great deal to simplify and lighten the modern fighting machine but, generally speaking, if I am to accept the role of prophet, I would say that within five years the speed of the military aeroplane will be roughly in the order of 250 m.p.h. for a fighter and 220 m.p.h. for a light bomber; and that the range of the single-engined type bomber would be very much increased; that the bulk of machines will remain small and that development will take place by large steps at long intervals, rather than by small steps at frequent intervals as in the past.

These results may appear rather meagre and disappointing compared with the phantasy that can be conjured up by the imaginative journalist,

but I am of the opinion that we have just passed through a very big stage of development in military aircraft of most types, and that some time is needed in which we may take stock of the possibilities of these new machines; new tactics and fighting methods may be evolved in accordance with their qualities and experience gained generally before ideas can be formulated as to which direction the next stage in evolution is to take. I do not mean that progress is slowing up or need do so, but I do think that with the many new types now offered to the Services by the combined efforts of the Air Ministry and the industry, full time should be taken properly to estimate their possibilities and take stock of the new production situation created by metallising the construction before further development on the same lines is pursued too extensively.

DISCUSSION.

GROUP-CAPTAIN R. H. VERNEY, R.A.F.: I think the Lecturer has not been quite fair to the Royal Aircraft Factory, which produced the De Havilland's B.E.2a, the seaplane which won the War Office competition of 1912, and which, at that date, was really in a class by itself, and far superior to all other aeroplanes. Most of the difficulties of those days arose from the inexperience of the manufacturers, and the Royal Aircraft Factory were obliged to do difficult work which the manufacturers would not undertake. I consider the Lecturer's comparison of the D.H.4 with the D.H.9 was not quite fair, because the D.H.4 was a development of the D.H.9, and had a very much higher horse power. Retention of the Liberty engine in the post-war years for reasons of economy had retarded development. I do not think the "Fawn" was one of Mr. Fairey's best efforts.

CAPTAIN TURLE, R.N.: Mr. Fairey said that the specification had to be very flexible, and there was still need for further simplification and elasticity. I have in mind only the specifications for the Fleet Air Arm, and it seems to me that these specifications are very elastic and the limits are very few. But we must have some definite limits. On board ship there must be a limit in weight; the cockpit must be reasonably comfortable for the crew to carry out their reconnaissance and their work, and so on. If he wants those limits made more flexible, it seems to me that when the designs are sent in by the manufacturers we should have a lot of aircraft which might have to be turned down at once.

Take some of the recent designs submitted for Fleet Air Arm aircraft. A limit of weight was given, and a design was sent in with a weight just below the limit. That was the trial aircraft, but I ask what chance was there of getting this weight being adhered to when it came to production. Weight is all-important on board ship; we adopt an aircraft of, let us say, 4,000 lbs at the trial, but by the time it is put into production it is up to 4,500 lbs., and all our arrangements for catapulting are upset.

In another specification the cockpit is specified to be comfortable for the observer. A very good aircraft had to be turned down the other day, I understand, by the Air Ministry because the cockpit was so shallow that if the observer had raised himself in his seat he would have been blown out of it.

Mr. Fairey spoke also about the economical speed; this difference between the economical speed and the cruising speed wants reducing. That is another matter which affects aircraft working with the fleet. We want long endurance machines

which do not weigh too much, but whose economical speed is not too low, i.e. 80 or 90 knots. If too slow, then your operations suffer the maximum interference from the wind and occupy the maximum of time, but we want to cut both those down to a minimum, and yet we require a reasonable endurance. We do not seem to be advancing in that direction.

Finally I should like to ask Mr. Fairey one question more. He alluded to the standard of aircraft manufacture in this country at the present moment, which I understand is very high. We do not want to go into comparisons, but one does read such a lot in the papers about this diving bombing development in the United States, and one sees in the United States papers that their aircraft are built with a much bigger safety factor than ours. They state that they go in for diving bombing tactics and that they come out of a dive at a very low altitude in a way which our machines will not look at. What are the facts?

WING-COMMANDER C. E. MAUDE, R.A.F.: I was interested in Mr. Fairey's opinion that the interval between types will, in future, be longer than it is at present. I cannot help feeling that this is rather a retrograde theory. I do not know what the exact figure is at present—I should be interested if Mr. Fairey could tell us—but I have heard that the delay, or rather the time lag, between the issue of a specification and the final production of a machine for service is something between three and four years. It would be disheartening if such a delay is to be increased, or if the time lag between the production of one type and the production of a succeeding and better type is to be lengthened at all.

There was another point on which I was not very clear from Mr. Fairey's remarks, and that is the effect of metal construction. I should have thought that though types differ in themselves, yet the components would be similar, and that the same parts could be used in different types of machines. I do not, therefore, see why every individual type should require its own special tools to enable it to be built. In that connection it would be of interest to know whether each aircraft firm makes use of its own special type of metal construction, or whether there is a standard form which is applied by all manufacturers.

He suggested that increased engine power is the only means of achieving higher performance for fighters; that, of course, is true, but I understand that the increase of engine power is not altogether desirable from a war point of view. Already we have units of something like 500 h.p., and any higher unit of power than that in any one engine is likely to lead to production and supply difficulties in time of war.

THE LECTURER:

First, in answer to Captain Verney, I do not wish in any way to disparage the B.E.'s, which played a great part in the development of military aeroplanes, but I contend that the existence of Government design, the details of which were to be broadcast to manufacturers, was proved impossible, and is now, I presume, for ever abandoned. It could not work, and it did not work; and even if the designs were good (and I contend that they were not as good as the contemporary private designs such as the Sopwith "Tabloid" and so on, which displaced them) you cannot concentrate your drawing office in one place and your manufactory in another; the system of design is linked up with the form of construction; the form of construction is tied to the plant and machinery, and an aircraft factory is a unit in which design, experiment and manufacture are all one. I maintain that the proposed pre-war system of Government design for private manufacture is impossible.

Now, in regard to the Aircraft Factory instructing the manufacturers how to construct during the War, I dispute that very strongly. I think you will find that it was the private manufacturers who came to the rescue, and really introduced war mass production. It was the Sopwith Company, I believe, who first put counters on presses, and set their presses going continuously to supply themselves and many sub-contractors, and were making a foreign manufacture in France, and so on. From my own experience as a manufacturer, I do not know that we owed much to the Aircraft Factory, at any rate not so much as to the pioneer firms such as Short, and particularly Sopwith.

With regard to the D.H.4 and the D.H.9 and D.H.9a, I think he has misunderstood me. I only illustrated those as the war-time two-seaters—a most wonderful series of machines—and the comparison with the "Fawn" was to the detriment of the "Fawn." I quite agree with him; the "Fawn" was a horrible machine. All I was trying to do was to shift some of the blame for it on to the system of liaison with the Air Ministry and the type of specification then in force. As to the suggestion that the failure to improve was due to needs of economy, I do not agree, because the illustration I am taking of the failure to improve was the "Fawn," which was produced, I think, at great expense to the Government. It was the new type which was intended to incorporate all the war experience.

Now, as to Captain Turle's point with regard to the necessity of insisting on Fleet Air Arm specifications, I quite agree with him. I tried to point out that we are now, if not entirely satisfied, very much more satisfied with the Government specifications than we were in the past, and, if I may say so, in particular with those of the Fleet Air Arm. We realize that they cannot be reduced to nothing at all, and the only outstanding points now are such as I attempted to illustrate—the defects of the machine gun, the clumsiness of some of the equipment, and some other things on which there are restrictions.

As to the weight of the machine when put in production, I know it never comes out as designed. Aircraft manufacturers are optimists; they have to be. There are no pessimists, and we always think the machine is going to be a little lighter than it is. I think we shall both have to take steps; the manufacturers will have to estimate a little better and the authorities will have to allow more weight; they run it too close. In the current specification, after allowing the dead load and weight of the engine and power plant, the manufacturer found he had only 26 per cent. left with which to build the aeroplane. That is not enough; and with such a specification the finished machine is almost certain to be over weight.

As to economic speeds; that is out of the designer's hands; it is one of the laws of nature. Cruising speeds tend to come out too low for service purposes.

Captain Turle raised another very interesting question on which I should like to put forward some views, that is the question of American diving bombing and the factor of safety of British aircraft. We have been through a great many stages in arriving at the factor of safety of British aircraft: many tests and experiments, much research, and a good deal of wrangling between the designer and the Air Ministry. In my opinion—it may be a biased opinion—we have arrived at by far the best compromise of any country in the world. Our nominal factor for a British fighter of this kind is, I believe, "8," based on the yield point of the material. The advertised French and American factor is, I believe, in the case of the French, "12," and in the case of the American, "16." Now, the French is "12" on the ultimate, with the C.P. forward. The requirements as to wing torsion, tail load, and other things in the French design, render it impossible for a machine to reach a diving speed pulling out from which would set up

12G; so this factor is absolutely useless. With regard to the American "16," if this is correct, I do not believe it is really needed, and if you had it, what use would it be? A man would be killed long before you imposed 16G on him. I do not know what a man's liver would weigh under 16G, but it would be something like half a hundredweight. A man cannot possibly live under those conditions; so there is no good in having the machine in one solid piece if the pilot is dead inside.

I allude to a personal aspect of this question. In connection with our Belgian contracts it was pointed out to us that our nominal factor was "8," whereas that of our French competitors was "12." I was sent for by the Belgian authorities to inquire what was to be done about this, since I claimed that "8" was sufficient. I said, "We are prepared to go up to 25,000 ft., to put the nose straight down and to dive at a velocity of 385 m.p.h.; will the French do that with their machine?" The French constructors said they would not, and that is how we won the day with a factor of "8."

With regard to Wing-Commander Maude's point, that the interval between the types may have to be longer; I did not mean that there would be a greater interval between the specification and the production of the type, but that the interval between the introduction of a type into the Service and the introduction of a replacement type would be longer; and I think that will be the case, unless you are going to spend more money. On a basis of roughly the same expenditure that is at present going on it will be impossible for it to be otherwise. If you are going to try to shorten the period it is going to be very expensive, and I think my point is borne out by the fact that if you say this is now three or four years, obviously it is already very much longer than it was during the War.

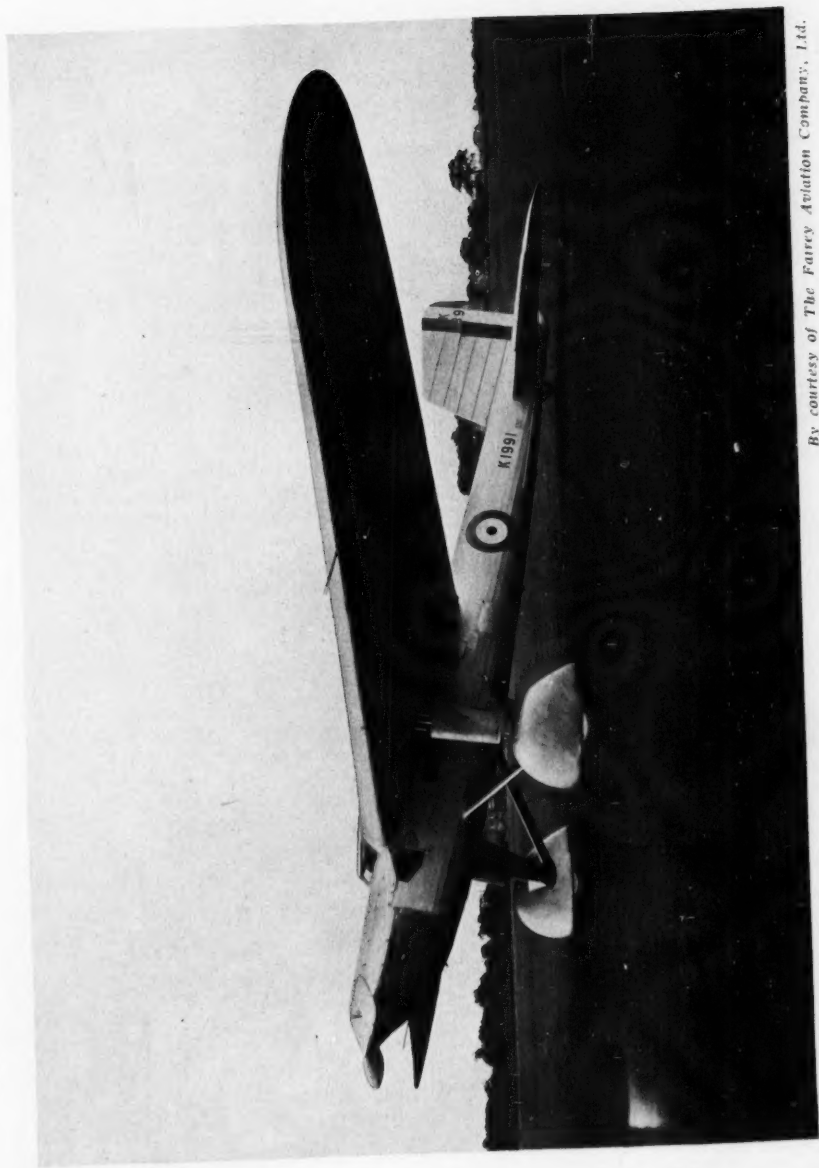
The next point which, I think, Wing-Commander Maude raised was about metal construction and whether the same parts could be used in different types or whether we each have our own system. Yes, we do. If we had a similar system I do not think it would help, because we should not have a similar size. You can take any part you like; you can make an inkstand with a press tool, but if you reduce it by 1/16th inch you want a new press tool; so that although we have the same system—we have the same system in the sense that we all use stampings and all use strips or tubes—yet, since the exact dimensions are not the same, the tools are not applicable; nor does it ever work out that more than a tiny percentage of tools are applicable; because you have to cut things so fine and design so exactly to remove every ounce, that you cannot transfer one part to another machine without a waste of efficiency.

As to the question of increasing engine power and war production; the heavier the machine, the more costly; the less, therefore, the war production. It is entirely a question for the Staff, and not for the designer, to say whether they will have fewer engines of higher power, or more engines of lower power: whether a few machines of high performance are better than a larger number of machines with lower performance, and whether they are prepared to face the cost and delay accordingly. All I can say is, if you want faster scouts than you have got at present—and I think they are pretty good now—we shall want more power. We have gone as far as we can for the moment in cutting down the drag: the next stage, I think, is more power.

THE CHAIRMAN:

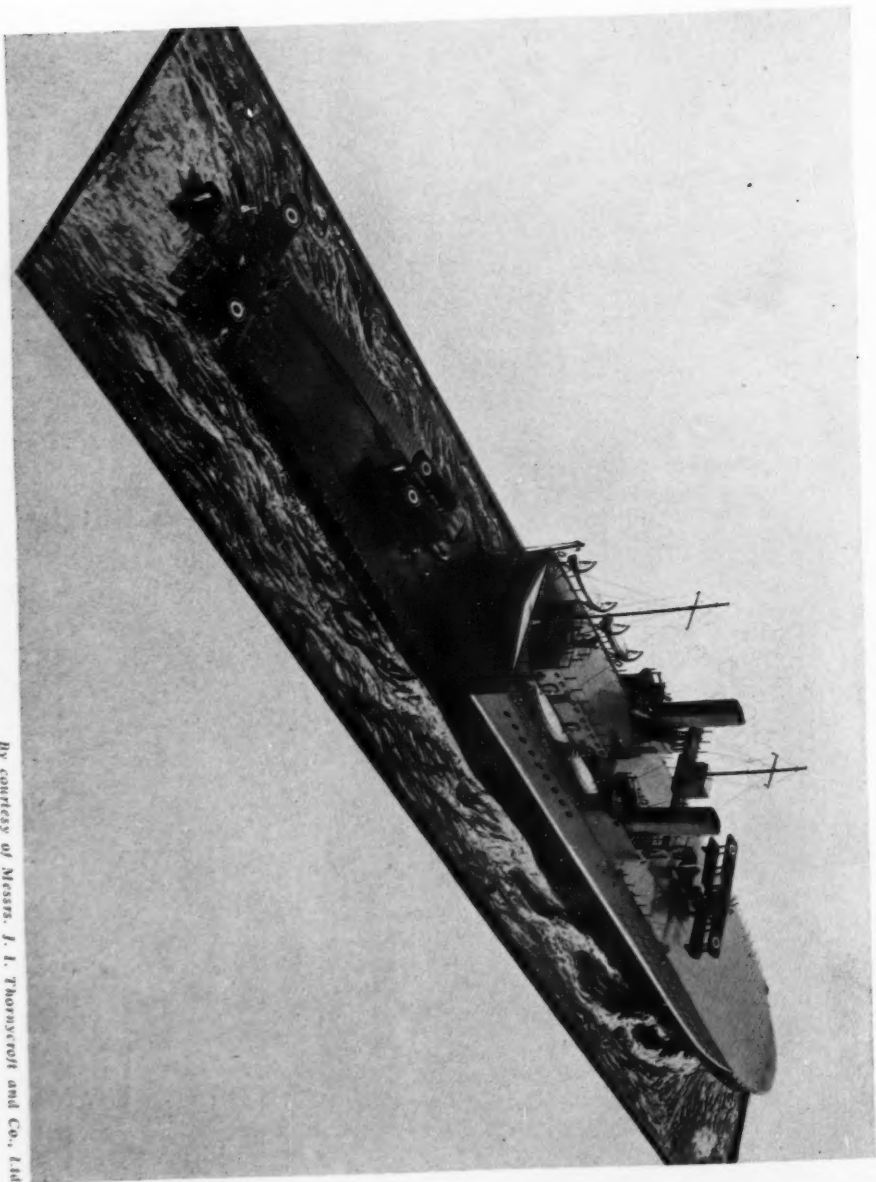
I think Mr. Fairey has dealt very comprehensively with the points raised in the discussion. He has pointed out the danger of attempting to standardize methods of metal construction at such an early stage of its development.

The customary votes of thanks to the Lecturer and Chairman were passed by acclamation.



By courtesy of The Fairey Aviation Company, Ltd.

FAIREY LONG RANGE MONOPLANE
(Fitted with Napier "Lion", Series XI, engines)



By courtesy of Messrs. J. I. Thornycroft and Co., Ltd.

**MODEL OF A
THORNYCROFT DESIGN FOR A SMALL SEAPLANE CARRIER**

HIGH SPEED CRAFT FOR NAVAL USES

By SIR JOHN E. THORNYCROFT, K.B.E., M.Inst.N.A.

On Wednesday, 11th March, 1931.

VICE-ADMIRAL R. R. C. BACKHOUSE, C.B., C.M.G.,

Controller of the Navy, in the Chair.

THE CHAIRMAN, introducing the Lecturer, remarked that he was the head of the well-known firm which had been associated for many years with the development and design of high speed craft, and which, it was probably true to say, were the pioneers in such development.

LECTURE.

AT a time when disarmament is so much advocated by those who regard it as likely to prevent war, the builder of fighting ships is on rather delicate ground in referring to them. But members of the Royal United Service Institution know that naval architects and shipbuilders in different countries are continually striving to improve in one way or another the efficiency of the vessels for which they are responsible, and that advances which are made are almost always applicable to fighting ships as well as to those intended for peaceful purposes. The advocates of a general reduction or limitation in naval armament seem to have overlooked the tendency this has to accelerate the adoption of improvements in design, and so make for increased efficiency in any class of warship.

It seems worth while to consider if the rapid progress which was made in the pre-War period, resulting from the employment of oil fuel and the steam turbine, is being maintained. It is hardly necessary to mention how great the change was, more particularly in the efficiency of the lighter high speed craft such as destroyers. Originally such vessels could only steam for very limited periods on their coal supply, and their reciprocating engines were incapable of giving a maintained full power output for long periods, like the turbine. It was not possible during

the War period to experiment to any great extent ; rapid production of proved designs being the first consideration.

The use of the geared turbine in destroyers had just started before the War and, as the results were much better, it was natural that it should be generally employed, but tentative experiments with superheated steam were regarded as being attended with too much uncertainty for it to be generally adopted. Nevertheless the destroyers and flotilla leaders which were built gave remarkably good results and showed how reliable the boats were in continuous hard work ; records of 100,000 miles without overhaul being put up in numerous cases before the end of the War. While it may not seem a great record for an Atlantic liner, it is certainly a good record for a destroyer under war conditions without any refit to machinery.

Unfortunately very few new vessels of the destroyer or any other class have been built in this country since the War, and for various reasons Continental builders, who in the case of some countries have had large orders for their own navies, have secured many of the orders for the navies of countries that do not build themselves. When the published speed performances of some of these vessels have been compared with those of similar British types it appears that great advances have been made, and the layman is inclined to think that the British engineers and naval architects have been lagging behind ; but before drawing such conclusions, more definite comparisons must be made. The first two experimental destroyers built for the British Navy after the War, the "Amazon" and "Ambuscade," had a contract speed of 37 knots. The "Acasta" type which followed was approximately the same displacement and dimensions as the "Amazon" but of rather less power and speed. Thirty-six or 37 knots does not sound very much when contrasted with the published performances of the French and Italian destroyers of 40 knots and over, but various factors must be taken into consideration before a true comparison can be made. It is well known that all official Admiralty records are taken in deep water, so that there is no question of the depth increasing or reducing the result ; also the speed is taken with the vessel loaded with fuel for the trial of six hours in addition to a full supply of ammunition and stores. Further, there is a limit to the degree to which boilers can be forced, governed by the amount of fuel burnt per square foot of heating surface. There is little doubt that the British vessels referred to are capable of 40 knots or more, if run under the most favourable conditions for speed and no limit placed on the rate of forcing the boilers—the latter, it should be noted, is independent of any efforts on the part of the stokers

where oil fuel is used. Forty knots should not be regarded as a phenomenal speed, as the "Teazer," built during the War period, with a lighter armament, obtained this speed when tried in deep water with the usual condition of loading and some increase in the normal degree of forcing the boilers.

Having dealt with what perhaps may be described as "legend" performances, it is important to consider the actual developments that have been worked for and obtained. No material improvement, from a speed point of view, has been found possible in the form or construction of the hull. Some laymen have wondered why the step shape that is adopted in C.M.B.s and other small high speed boats is not employed for larger vessels. It is well to explain that the skimming effect follows definite laws of proportion and that, while a 50 ft. C.M.B. will begin to lift and skim at about 30 knots, assuming it were possible to put enough power into a 300-ft. destroyer of a similar form of hull, a speed of about 70 knots would have to be attained before any skimming took place. With present knowledge it would, of course, be quite impossible to provide for 200,000 h.p., the minimum required to attain this speed. It is interesting to recall that Ramus, the pioneer of the skimming form of hull, urged its adoption for the Navy about half-a-century ago, and Froude was commissioned by the Admiralty to investigate the possibilities of its employment in the model testing tank which he had just equipped, and the deductions he made from his experiments stand correct to-day.

Failing any appreciable advance in hull design, the propelling machinery had to be worked on. The gearing of propeller shafts enabled designers to proportion the screws so as to give the best possible results. Improved efficiency of the turbines has, of course, meant less steam and consequently less fuel for a given power. Very material advances have been made by the employment of superheated steam in the turbines and improvements in the boilers as well; so there has been a double gain. The trials which have just been completed with the destroyers building for the Canadian Navy¹ have shown that the consumption is so low that the fuel supply gives them a radius of action of 7,500 miles at cruising speed, or rather more than double the average of the destroyers built during the War period. It is common knowledge that the "Acheron," building for the British Admiralty, is being fitted by Messrs. Parsons with machinery which will work at about double

¹ These are generally of the same dimensions and power as the "Acasta" class, but, in view of the service they have to perform, are rather more heavily built and have no superheaters.

the pressure of previous vessels. The late Sir Charles Parsons anticipated that this increase, coupled with superheated steam, would very materially improve the economy, and if a high enough pressure were used there would be little doubt that results comparable with those obtained with Diesel-engined ships would be achieved. He often expressed the opinion that, as soon as the machinery in the "Acheron" had been proved successful, an experiment should at once be made with 1,000 lbs. pressure. One can only hope that, inspired by his enterprise, those who have to decide when the time comes will have the courage to try what he would have done and so maintain the country's leading place in marine engineering achievement. The experience gained with some destroyers built on the Continent and larger mercantile ships in this country fitted with fairly high pressure go to show that the forecast made by Sir Charles Parsons for the "Acheron" is amply justified.

It must be evident, from what has already been said, that very considerable progress has been made since the War period and that the vessels of an earlier date, from a fighting point of view, must be to a great extent regarded as obsolete.

Matters connected with armament do not concern the naval architect and shipbuilder beyond providing the structural arrangements to carry the guns, torpedo tubes, etc., but it is safe to say that the improvements that have been made are comparable to those of propelling machinery. The high bridge structures which are now necessary to carry the director firing gear, range finders, etc., have been greatly improved as a result of considering them as part of the original structure of the vessel rather than, as was formerly the case, a number of erections placed upon the deck to form a wheel-house, bridge, etc. Whilst freedom from vibration has been achieved making it possible to use various instruments satisfactorily at high speed, something still remains to be done in the way of protecting those on the bridge from smoke and funnel gases which are apt to be troublesome under certain conditions. Merely lengthening the forward funnel is an unsatisfactory and imperfect solution of the problem, and it would seem that experiments are needed to ascertain the right way in which the bridge structure should be stream-lined to join up with the funnel. Something may perhaps be learned from the experiments which have been made on the modern big locomotives which have such a large boiler that there is practically no funnel left and on which it has been found the exhaust steam and smoke seriously interfere with the driver's vision. Mr. Gresley of the North Eastern Railway has shown, by making experiments in a wind tunnel with the

ordinary arrangement of boiler front and funnel, the smoke actually travels forward and downward before taking a definite course upwards, and with suitable screens alongside and in front of the funnel he has been able completely to alter the state of affairs. With this proof of what can be done it would seem that there is little doubt that an improvement can be made when the funnel is close behind the bridge. It is very difficult satisfactorily to lead it aft in a destroyer, although it has, of course, been done in the case of some classes of destroyers and cruisers. Interesting examples are the light cruisers just completed in Italy for the Argentine navy, where all the uptakes are combined in one very large short funnel far away from the bridge. It would seem now, even in the case of destroyers, incorrect to refer to the part of the vessel from which it is commanded and fought as a "bridge," but the name is so well understood that it is probably best to employ it, and as its arrangement for the efficient working of the various instruments and effective control by the Captain is so important, it is worth while referring to it at some length. It is safe to say that the bridge will never be constructed which the Captain could not find some way to improve; but, for the help of the naval architect, there are some broad principles on which agreement might be come to. Before attacks from the air had to be considered it seemed to have been generally agreed that neither bullet-proof protection nor a conning tower were required, but now that attacks from aeroplanes armed with machine guns are certain, there are some who think protection is advisable and, in some cases, an enclosed bullet-proof house is now being provided for the Captain and those on the bridge. There are obvious disadvantages in the arrangement, but possibly it is worth while. Some officers have suggested that a sort of bullet-proof umbrella would be sufficient, but such an arrangement is not at all easy to arrange satisfactorily; a possible solution would be to make it of bullet-proof glass.

It has been stated that the naval architect is only concerned in the armament to the extent of providing the platform for the guns, and, in this connection, it may be remarked that a twin mounting simplifies his design for a given number of guns; but, although on paper a vessel with guns disposed in this way may appear equal to another in which they are mounted separately, it is very doubtful if they would prove of equal fighting value. The Italian "Dardo" class is an example of destroyers fitted with twin 4.7's, both fore and aft.

One may perhaps assume that the size of destroyers which the British Navy has adopted as standard since the War is the most suitable for our requirements in this class of vessel, as it is the result of the very

wide experience gained with destroyers employed on services which varied from that of the Harwich striking force to convoy duty, and foreign navies generally have conformed fairly closely to it. Although the six vessels built quite recently for the Chilean navy are smaller, they carry the same torpedo armament and three 4.7 in. guns.

The new British flotilla leaders are now, to all intents and purposes, the same as the destroyer, although those built during the War were of considerably greater dimensions and more heavily armed. One cannot say if the present policy is merely on account of cost or for some other reason, but, in some navies, there seems a tendency to make the flotilla leader something more approaching the light cruiser and, in others, the destroyers as large as the British war-time flotilla leader. No doubt some of the smaller Powers, with only a limited number of vessels, may find it advisable to have something more in the nature of a general purpose vessel, and this may account for the increase in size of the vessels which they designate as flotilla leaders.

The size of ship in which the adoption of a double bottom is desirable must depend on the service which she is to perform and the additional security it will give her. Some destroyers were built in pre-war days with double bottoms under all of the machinery space, but they were for a navy which was very advanced in theory and very little good in practice. There is certainly a size below which the double bottom is so limited in depth that not only is the construction very difficult but it is almost impossible to give proper attention to it after the ship is completed.

Another feature about which it is possible to advance many arguments both for and against adoption is that of a protective or armoured deck, and when it becomes worth while. The aeroplane must have considerable influence on the matter, but there can be no doubt that the destroyer has proved such an effective vessel because the design was never hampered by having to provide protective decks and other complications which were introduced into the earlier vessels of about the same size, called torpedo gunboats. The Navy possessed a great many of these craft rather more than thirty years ago when the first small destroyers of about half their tonnage were introduced; but the latter at once superseded them.

With the development of what perhaps may be described as the "super-leader" the capacity to carry one or more aeroplanes is sometimes called for. To meet such a requirement really effectually would

need a very material increase in size, and it seems questionable whether it does not call for an entirely different design of high speed vessel, if the aeroplanes are going to be of real use. While with the catapult it is perfectly feasible to fly a machine off a small vessel, it is not possible to land it on again, and even in the case of the American 10,000-ton cruisers which carry seven or eight aircraft, the only means of putting them on board is by a crane to pick them out of the water when the vessel is stopped. The increasing importance of the part which will be played by the aeroplane in naval warfare must influence the design of ships other than the enormous carriers that have been produced with decks from which they can fly off and on. It is possible to argue that a number of comparatively small carriers fitted to carry aircraft would be more useful and much less vulnerable, always provided the latter could return to them. If it is accepted that a modern flying boat or amphibian is capable of performing the services which the fleet needs, it is suggested that a carrier of comparatively small size and power could be provided which could run at approximately destroyer speeds and operate with a fleet as required. Since it is only possible to land on a deck of quite considerable size, the return to the carrier must be effected by first alighting on the water, and some way must be provided for the aircraft to be brought on to the vessel which does not necessitate her being stopped to use a crane to pick it up. The wake produced by any ship has the effect of smoothing out the waves in a choppy sea, and in the case of vessels with flat wide sterns, the effect is very pronounced and there seems no doubt from trials that have been made that it is quite possible to alight in such a wake when the sea conditions surrounding it would make it otherwise quite impossible. Assuming this to be the case and that the plane is once taxi-ing in the wake of a carrier with a suitably designed stern, it can continue its progress until it runs on to the after deck of the vessel as it would on to the shore and be helped up into the hangar. Assuming it is necessary to carry aircraft on small-size warships, it would seem that a carrier could be built which would be much more efficient than the scout or cruiser, which is merely fitted with cranes or derricks for the recovery of its planes. A vessel of between 3,000 and 4,000 tons is large enough to provide space for six assembled flying boats and to have a long enough deck for them to fly off when the vessel is under way, without the employment of a catapult. Until an actual ship has been built and trials made of the weather conditions under which the planes can safely take on to her stern there must be some doubt about the scheme, but a long series of model experiments appear to show that a form of stern can be provided which will remain with the landing slope immersed when the vessel is under way in all but the most adverse conditions.

It is suggested that a number of small carriers of the sort would be more effective and less vulnerable than one large one which they might replace. There is also an important peace-time advantage, as the opportunities of flying practice from a carrier would be increased owing to the comparatively negligible cost of running such a vessel compared with one of the large carriers. Since cruisers and flotilla leaders are now required to carry planes as part of their equipment, it is perhaps not unreasonable to conjecture that the vessel equipped as a carrier only is merely a temporary phase in the development of the fighting ships of the future. The effectiveness of the aeroplane for attack, as well as for scouting and spotting, will no doubt affect the matter, but it would certainly seem that vessels of 3,000 or 4,000 tons could be built to be effective carriers and also be equipped with the torpedo and gun armament of a destroyer.

There can be no question that the design of small carrier described is also admirably suited for mine-laying and the necessary rails could be arranged in the hangar and on the after deck so that they do not interfere when the hangar is used for its normal purpose. An additional service might be that of a mother ship for C.M.B.s which would be carried on suitable cradles to launch them over the stern. Some may think that the small motor torpedo-boat, which is not much bigger than a large aeroplane hull, has been outclassed by the torpedo-carrying aeroplane, but in spite of the development which has been made for certain sorts of attack, the C.M.B. has much better qualities. That this is recognized is shown by the fact that ten or eleven of the smaller Powers have adopted them since the War in spite of their being well equipped with seaplanes.

In the earliest days of torpedo-boats (about 1878), and again when Lord Fisher introduced the destroyer to the British Navy (1894), papers were read before this Institution by the late Mr. John Donaldson and my late father describing the boats they had built and giving the results of their trial performances. As a representative of the same firm to-day, I am greatly privileged to have the opportunity of again referring to vessels of the light high-speed type with which it has so long been associated. I have thought it might be of some interest to give, in an appendix, a comparison, as far as is possible, between performances to-day and those which were obtained at the time of the previous lectures to which I have referred. In the case of small torpedo-boats, the modern C.M.B. enables a direct comparison to be made and, in the case of destroyers, while vessels of the same dimensions, cannot be compared the particulars show the very great superiority of present-day vessels.

APPENDIX.

COMPARISONS OF EARLY AND PRESENT DAY DESTROYERS AND TORPEDO BOATS.

	"Daring."	"Amazon."
Launched.	1893.	1926.
Length (O.A.)	185 ft.	323 ft.
Breadth ..	19 ft.	31 ft. 6 in.
Depth ..	13 ft.	19 ft. 6 in.
Displacement (Standard)	250 tons	1,352 tons
Horsepower	4,400	39,500
Speed on Trial (continuous)	27.7 knots	37.46 knots
Speed on Trial (on measured miles)	28.2 "	37.95 "
Complement	45	138
No. of Boilers	3	3
Type Machinery	Reciprocating.	Geared Turbine.
Fuel Capacity, tons	50	433
Approximate Cruising Radius	1890 miles	6,500 miles
Guns ..	1-12 pdr.	4-4.7
	3-6 pdr.	2-2 pdr.
Torpedo Tubes	3-18 in.	6-21 in.
C.M.B. Second-class Torpedo Boat.		
	1880-1890.	1915-1920.
Length ..	63 ft.	55 ft.
Beam ..	7 ft.	11 ft.
Speed, measured mile	17.3 knots	40.4 knots
Speed on two hours' run	15 knots	38 knots.
H.P. ..	170	750
Displacement :—		
Hull fittings and torpedo gear	5.16 tons	5.5 tons
Machinery, including fuel tanks and electric plant in C.M.B.	5.36 tons	4.1 tons
Armament (two torpedoes)	0.8 ton (14 in.)	1.27 „ (18 in.)
Fuel ..	1.00 ton *	0.97 ton †
Crew ..	0.57 (8)	0.36 (5)
	12.89 tons	12.20 tons

* Fuel sufficient for 4 hours' steaming. † Fuel sufficient for 5 hours' steaming.

DISCUSSION

VICE-ADMIRAL W. H. D. BOYLE: We often read that British engineers and shipbuilders are at a disadvantage because their vessels, built for the Admiralty, run their trials on different lines to those of the foreigners, who advertise very high speeds. Is there any reason why, as long as a vessel is in the hands of a builder, the firm should not run trials under the same conditions as foreigners and so give a good advertisement to British shipbuilding? Would the Admiralty object if these vessels were first of all used for that purpose, and then ran the necessary acceptance trials before entering into the Navy?

MR. J. DONALDSON: A shipbuilding contractor who recently returned from a trial of a certain foreign vessel told me that although the speed was undoubtedly

obtained the vessel was very lightly built and the boilers were obviously pushed pretty hard because there was about three feet of flame from the funnel, while the decks seemed so light they gave as you walked on them.

MAJOR H. W. HALL: Might I ask at what point the C.M.B. type of vessel becomes impracticable; I mean at what tonnage and at what horse power?

THE LECTURER: I think the limit of size in which it is practicable to adopt the step form of hull has already been attained. The 55 ft. C.M.B. is a good performer. During the latter part of the war some 70 ft. C.M.B's were made, but the indication was that that was a little bit over the limit for the power available. The 70 ft. C.M.B. would be quite the limit now.

As regards the first question about the contractor running trials on his own account before the boat was subjected to British Admiralty trials, I foresee some difficulties about that. If the contractor carried out preliminary trials, the Admiralty might require a certain amount of renewal of fire bricks, at any rate, before the official trials. The practice referred to, of some foreign shipbuilders running trials, is not, I think, an effort on the part of those shipbuilders alone; it may be that the Governments feel that they are doing the right thing in advertising that they have the very fastest ship. They may hope that it will never have to fight another one, but if it is advertised as being so fast, the other fellow will think twice before attacking him.

CAPTAIN D. NICOLSON: I am interested in the point raised about foreigners advertising the wonderful speeds they obtain, as I have just done a tour of many countries. A certain foreign nation recently built a large number of boats for another foreign navy. When tenders were invited the foreign figures of speeds were such that no British company could guarantee them, and we lost the orders. A few weeks ago, however, the trials of those boats showed several knots below the guaranteed speeds, and they cannot carry their specified loads. So that although in the past we have lost many good orders, I think we shall soon come into our own again.

The Lecturer states that we have made great progress in propeller design for destroyers, but I suggest that there is still room for great improvements in this respect. About this time last year I discussed with many engineers and naval architects the speeds of propellers, and when I mentioned that I was building a boat to do 12,000 revs. per minute they told me I was mad. However, we have actually now produced propellers turning at 12,500 revs. and giving a very high efficiency. This time last year these speeds were not considered possible.

In regard to the design of a small aircraft carrier, I would like to suggest a type similar to that which has been tried by foreign governments. Instead of having the after deck with very little free-board they have carried it much higher. The landing platform at the after end is fitted with a large canvas slipway with bamboo canes in the bottom. The machine lands in the wake and then taxis on to the canvas, the pilot makes fast with his grip hooks and is then hauled up. With the present aircraft in the Service I do not think that the type of vessel described by the Lecturer would be any good, because we find in deck landing that the eddies and currents of air from even one funnel have caused many crashes. With the enormous square deckhouse aft the pilot would have to land a long distance astern, which rules out this design.

I would like to suggest to the Lecturer that at the after end of the deck there should be rollers which would enable the machine to land easily on the ship. Also I think the deck house might be stream-lined, where the doors opened; and I

think with a very much higher free-board it would be useful. The deck forward looks to me to be quite adequate for getting off, but I do not think the deck aft need be half as long, as the aircraft do not have to land on the deck.

As a matter of interest, two years ago Saunders-Roe built small carriers to take the Schneider Cup machines on board, and we had at the after end a sliding platform which went right out and below the free-board of the machine, and as the aircraft came along the roller caught the front part of the machine, which was then hauled on top of the platform, and the whole taken on board.

The width of the stern, as shown in Sir John's model, will have to be reduced, otherwise the eddies will prevent the aircraft from being easily taken on board his proposed carrier.

COMMANDER L. C. SHARMAN, R.N.: Is there not a slight misunderstanding on the part of the last speaker? He gives the impression that one is going to land on the deck of this carrier. That is not the case. This is a seaplane carrier, and one would land in the water astern and taxi on to the after part of the ship.

The problem of getting aircraft back to their ship is an all-important one. You can get them off any type of ship, but the difficulty is to get them back. It would be interesting to know whether, with a ship of this type, you have got a better chance of landing a seaplane in the sea and getting it back than you would have of landing a land plane on a carrier. The motion of a carrier may sometimes be too great for deck landings, but probably in a long ocean swell you would have a better chance of landing on a large carrier than of landing a seaplane.

THE LECTURER: The idea underlying this design was that the carrier must in some way be made an easy thing for the aeroplane to get on to. Even when you have a boat of many thousand tons with a large deck you have certain disabilities. I have suggested that, if you have a number of boats of between 3,000 and 4,000 tons to replace one large one, they might have advantages on many occasions. The suggestion to land in the wake and then proceed up the inclined stern is admittedly an experiment, except in smooth water, but from trials that have been made of landing in the wake of some of the cross-channel steamers, I am told that a very strong opinion was formed that, when the water was not smooth, there was every chance of success but, as I have already said, it is something you cannot be sure about until trials of full-size boats have been made.

COMMANDER SHARMAN: I do not think the air currents would have any effect when you were landing. If you land right astern of the funnel of an aircraft carrier you get an effect, but five feet out it is perfectly smooth air. I think in this proposed class of ship you would have no difficulty in landing in the wake. I do not think the air eddies set up by the forecastle running along and then dropping would affect you. My experience is that when you fly low behind a carrier, you have to be quite close up before you really get the eddies.

CAPTAIN NICOLSON: My experience is that at least 150 ft. from the stern you feel the eddies. Not long ago I had a very bad crash through trying to land only 100 feet from the stern.

COMMANDER SHARMAN: It would be interesting to know how long the after part of this particular ship is.

THE LECTURER: It is about 90 feet I should think.

COMMANDER SHARMAN: I suggest that any aeroplane landing would not touch the water nearer than 200 feet from the stern. I should think there would be at least 300 feet between the superstructure and the point on the sea where the aircraft touched the water, and in that case you would not be worried with eddies.

CAPTAIN E. ALTHAM, R.N. : We know that in the past there have been cases where ships of apparently very fascinating design have been built for the Navy, and after they were completed we have had to try to discover what use to make of them. One can conceive many uses to which a ship of the design proposed by Sir John can be put, but I think it would be interesting to know what he has specifically in mind as to its virtues in comparison with the big aircraft carrier. Are we to visualise a flotilla of these craft entirely replacing the big aircraft carrier ?

THE LECTURER : I have been speaking as a shipbuilder and naval architect and not as a naval officer. This design was worked out two years ago, and I gather that considerable progress has been made since then in the use of aeroplanes for the Navy, and in my remarks I suggested that it might be that the pure seaplane or aeroplane carrier was a passing phase, and that in view of the fact that ten thousand ton cruisers carry planes, it might be anticipated that the flying equipment would be the standard equipment for all fighting ships in the future ; but I was not prophesying.

REAR-ADMIRAL W. TOMKINSON : The Lecturer suggested that his ship could also be used for mining ; but I am doubtful whether, with that design of stern, it would be suitable for that purpose. I realise you must have something of that sort for the aircraft, but I suggest that rails for mines might create difficulties. Apart from that, in laying mines it is necessary to have a trap and men to work it at the extreme after end. With that kind of stern, I think, very few of us would care to form the crew for letting go the mines.

THE LECTURER : What would be the objection—that the mines would get washed off ?

REAR-ADMIRAL TOMKINSON : No, the men would be washed off.

THE LECTURER : I was rather suggesting that a vessel of this sort could provide a very convenient stowage for mines. She would hardly be used for two purposes at one and the same time.

CAPTAIN C. E. TURLE, R.N. : Would this form of stern be applicable to any warship no matter what type, or would it have disadvantages which would make it unsuitable for, say, a medium sized cruiser ?

It has been suggested that a canvas ramp might be used instead of the ramp forming part of the hull of the ship. It seems that the canvas has a very great advantage. You have got to get from the sea moving one way into the ship which is moving another way. The amphibian has a very good chance of being damaged in moving directly from one place to the other, whereas if you have a flexible connection between the sea and the ship the craft is much less likely to be damaged.

THE LECTURER : That suggests that a canvas bag would be a more flexible and easy thing to land into, but my own feeling is that anything in the nature of a sail in the water, even lashed to bamboos or spars, would be a most unpleasant thing to deal with. A vessel of this sort, in order to be effective, would need to be always travelling at about ten knots or more, and you are going to come on to the stern at that speed. I cannot conceive any kind of canvas sail which would keep its form in the water at anything but a very slow speed.

With regard to the stern being applicable to other types of ships ; if from the naval architect's point of view you have a satisfactory bottom form there is no reason why you cannot build vessels of quite a considerable tonnage with the same form of stern. It is simply a question of whether the inconvenience which

might be caused by a following sea would be more than counterbalanced by the advantage of being able to run on an aeroplane.

A MEMBER: I have seen a cinematograph film of this canvas, and it stood up to 12 knots perfectly well.

THE CHAIRMAN:

I understood the Lecturer to say that he thought the Admiralty was going sufficiently fast in the matter of development of power in destroyers; this, from our point of view, is pleasing to hear. We do not believe in putting more power than is necessary into the ships we design. When the design of a destroyer is under consideration the speed desired is settled, and the power which is necessary to give that speed is arranged for. We see no object in putting more power into a ship than is really needed to give her the speed decided upon. Another feature we have to consider specially is operational efficiency; which means that the vessel can be operated without difficulty and to full advantage by the officers and men she carries and that she is economical in fuel and reliable. Reliability is the most important of all requirements for a warship. Yet another consideration is that we should get long and good service out of her. I have no hesitation in saying that if we asked for much higher speeds than we are asking for now, the contractors would be only too glad to give them to us. The Admiralty has not asked for those speeds because we do not require them, nor have we asked for power in excess of what we require.

With regard to the point which Admiral Boyle made about trials, it might be an expensive thing for the contractor; it would certainly involve extra expense and from the Admiralty point of view I think it would usually be unwise. The contractor in order to get a high performance, might possibly place an undue stress on some fittings, or force the boilers and machinery, and possibly damage would be done thereby. We have to look at matters from a financial point of view, and the question would arise as to whose liability it was. I do not think the Admiralty could say it was theirs, and then the contractor would have to pay for any damage that had resulted. Actually the question has been considered. It will be considered again if we think there is advantage to be gained from it.

I have been reading a book which implies that we are going in for fancy speeds and powers but on that point our conscience is quite clear. We have never asked for fancy speeds or powers. Our destroyers are designed for hard wear and use, and a reasonably long life.

With regard to the lecturer's remarks on bridge design, we have carried out many trials on this question of stream lining and have used models in wind tunnels. It is an intricate problem, because no sooner do you get what you think ought to be a perfect form than you find there are difficulties. It is curious, but we have discovered that a straight fronted bridge is much more effective against draughts than a stream lined bridge. We did try and improve the bridges of the new destroyers by stream lining certain parts, but we discovered it was a mistake, so we have gone back to the straight front. It is also difficult in a destroyer, where so much has to be put into such a relatively small length, to find room to separate the funnels and bridge to any great extent.

I was interested in what the Lecturer said about bullet proof glass. There has been a lot of discussion about bullet proof protection for bridges, and this glass appealed to me as a possible means of providing protection without prejudicing look-out, two very conflicting requirements. It is said to be able to

keep out a pistol shot at point blank range. Some foreign navies are apparently going in for closed in bridges. We have not done so hitherto, except in a few instances. There is strong divergence of opinion in the Service about it. Some officers like covered in bridges, and there are others who do not, and it is very difficult to know sometimes who is right and who is wrong, so we have to be cautious about it. Ships, and especially destroyers, have to work in all sorts of conditions on service and the views of experienced commanding officers must be considered.

With regard to the building of experimental vessels, such as the seaplane carrier described by the Lecturer, a vessel of this type might be useful for certain operations, but under other conditions it might be of no value. I endorse what Captain Altham said—that we have not got enough money at present to go in for vessels of an experimental type unless we are quite sure what we are aiming at and what we are going to use them for when completed.

I would like to say once more, with regard to the speed and power of modern ships, that it is not that we think that the contractors in this country cannot do it. We know that if we asked for much more horse power we could get it. It is interesting to see these very high powered, high speed foreign craft being produced, but each country knows best what it wants for itself. We believe we have got what we want in the more moderate powers and more moderate speeds, although if our destroyers were more highly forced on trials we could undoubtedly get speeds in the region of forty knots. We do not, however, think it desirable, as previously pointed out, that boilers and machinery should be forced to this extent merely in order to obtain spectacular results at a trial, without the remotest chance or necessity of repeating them on service.

The customary votes of thanks to the Lecturer and Chairman were passed with acclamation:

MECHANICAL MOBILITY

By MAJOR R. A. BAGNOLD, Royal Signals.

I.

THE British Army is now undergoing a metamorphosis; it is being mechanized and armoured. By this process compensation for limited numbers is to be obtained in the form of enhanced mobility, fire-power and protection.

Now fire-power and protection are known factors which will remain constant all the world over—at least as long as no revolutionary changes take place in the equipment of foreign armies. But mobility appears to stand on an altogether different basis. Consequently, it might be well to enquire how far mobility developed under English conditions might emerge from a test applied to it outside England.

We already know that motor vehicles produced to suit English conditions are not suitable, for example, for service in the Middle East. Yet the country lying between Egypt and Afghanistan, both inclusive, cannot be disregarded as a possible area of operations; it is precisely in these regions that there exists the widest scope for mechanized warfare, and it is there that the outstanding mobility of a mechanized army could be developed to its fullest extent. It would seem advisable, therefore, to concentrate a sufficiency of our mechanized forces in this area to provide a training ground for personnel and experience in the design of vehicles. In so doing we should, in addition, be greatly assisting the British motor industry which, owing to its specialization to meet home conditions, is making no headway in the unlimited Eastern market.

It is also accepted that British military equipment, while suitable to meet the conditions of future warfare, must be serviceable in all possible theatres of war. With regard to most army stores, these requirements have, by careful trial and test, been admirably fulfilled. Mechanization, however, and all that is implied thereby, will continue to cause for many years such a revolution in military outlook, that it may be more doubtful whether, originating in the special climate and cramped conditions of England, the standard of universal serviceability is keeping pace with the ever increasing effect of mechanization in general.

Mechanization has been regarded as a change over from horse to machine, and old lines of reasoning are applied by analogy to the new conditions. This is apt to lead to false conclusions. Man is physically an animal very adaptable to differences of climate and terrain, and the widespread use of the horse has come about for the same reason. The farmer's boy, brought up to squelch his way through the sodden fields of England, proceeds to fight among the rocks of the North West frontier or along the dunes of Sinai. The Indian equipment mule, bred on plain or prairie, climbs the Himalayas and thrives at 15,000 feet through a Tibetan winter. In the old army, mobility was thus assured in all countries; it could be despatched to any habitable part of the globe with full confidence that it could cope with the particular kind of terrain to be found there.

Nowadays the army, since it relies on mechanism for its mobility, is faced with the problem of designing machines which will maintain or even increase its mobility while conforming to the demand for universal serviceability. But whereas animals are capable of adapting themselves to changing conditions of ground and climate, the machine is incapable of adaptation. Its original construction must embody all future requirements; its engine cannot by training become more powerful or its springs more elastic.

Still, man has a great advantage over Nature. He starts afresh, whereas Nature is clogged with the red tape of immemorable type-plans. So he is able to produce an immense variety of vehicles. Some are useful, some are not. Some sink in the mud, some stick in the sand. Some revel in mud but break to pieces on rock or boulder. Some thrive on rocks but carry little load. Some go anywhere but at a snail's pace, consuming much fuel. Once built, their qualities are unalterable.

This sensitivity to differences of surface conditions and climate is due not only to the inadaptability of inanimate matter, but also to the lack of that wonderful control possible in living beings. For the thousand intricate automatic controls which move an animal's legs independently over broken ground, have been substituted the two crude methods by which we drive mechanical vehicles—the variation of power and the turn of the wheel. Few vehicles can pass even minor obstacles unless designed with those particular obstacles in mind: on the other hand, a suitably chosen vehicle well driven can travel fast with a full load over country which would bring a horse to a delicate walk.

An army in process of mechanization, therefore, must study carefully the types of surface present in all various possible theatres of war: then, having made such a study, must so temper design that its

mechanical vehicles are assuredly serviceable over ground where they may be called upon to work.

As a first step in such a study, those parts of the world possible to mechanical vehicles should be divided into two main types: "wet" and "dry." By a "wet" country is meant one whose surface offers its chief obstacles to mechanical vehicles when wet; when dry, such obstacles tend to disappear. A "dry" country, on the other hand, is one whose very dryness is the cause of the obstacles. This division is particularly appropriate since, as far as experience goes, vehicles most suited to one type of country possess markedly different qualities to those designed for the other. In particular, a vehicle designed for a wet country may be of little value in a dry one.

In the following classification it has been assumed that armoured fighting vehicles and all first-line transport will be called upon in war to function continuously over terrain where no previous work of improvement has been done, and which may not even have been reconnoitred. This is not an official definition; indeed no official definition of cross-country action appears to exist; some confusion of thought has arisen in consequence. It is also assumed that second-line transport must be capable of supplying an army over tracks which have received the minimum of improvement. Areas where mechanical vehicles could never operate off made roads are not included, as for instance, mountain masses in rain country such as the Himalayas, and tracts of tropical rain forest, such as Brazil and the Congo basin.

The characteristics of a wet country are easy to describe; England can be taken as a typical instance. They are: thick population, good roads, good repair facilities, numerous rivers and canals which greatly reduce the scope of cross-country activity. In general, too, wet countries are characterised by a temperate climate, or one at least which does not run to extremes of temperature. The obstacles met with are mud, forest, short steep hills, canals and rivers, and shallow ditches. Of these, forest, canals and rivers can only be traversed by mechanical vehicles after previous work has been done on them. Steep hills exist in greater degree in dry countries, and so can also be ruled out. We are left with mud. Mud is typical of all wet countries.

Dry countries can be subdivided into areas containing various characteristic obstacles. The chief of these are: loose sand and dust, rock and boulder, mountains, great distances, high temperature and lack of water.

A list of the countries of the world south of Latitude 60° N. is given over, with the approximate proportions of each which are (1) totally unsuitable for cross-country vehicles; (2) of the "wet" type of surface;

(3) of the "dry" type. The classification is admittedly rough, since in many cases no data of the sort wanted exists at all, but recourse has been had to vegetation and geological maps. An accurate mechanization map of the world awaits detailed compilation by experts in cross-country driving with various types of vehicle over all types of country.

Proportionate Areas

Country	Unsuitable for		
	cross-country vehicles	Wet type	Dry type
Europe	5.6	14	1
Africa	9.2	37	32
Syria, Palestine, Transjordan..	.4	.4	.5
Arabia	—	—	8
Asia Minor .. .. .	.6	.6	.7
Persia .. .. .	.3	1.0	3.0
Iraq	—	.7	.1
Afghanistan .. .. .	.5	—	1.0
India	4.4	6.4	1.9
E. Indies and Indo-China ..	6.9	2.4	—
Australia.. .. .	1.2	8.0	9.0
China, Tibet, Japan	7.4	12.0	9.0
Siberia and Central Asia ..	10.0	4.0	10.0
North America	17.0	17.0	10.0
South America	30.0	16.0	3.0
Total	93.5	119.5	89.2
Per Cent.	31.0%	39.5%	29.5%

It will be seen that 31 per cent. of the habitable world's surface is unfit for cross-country mechanical vehicles, and of the remainder 58 per cent. is "wet" and 42 per cent. "dry."

Perhaps a better estimate of this proportion in possible theatres of war would be to take only the territory within 300 miles of British owned or British influenced lands. The proportions on this reckoning would appear to be: unfit 21 per cent., and of the remainder "wet" 57 per cent. and "dry" 43 per cent.

It thus appears that a little less than half the terrain where operations with mechanical cross-country vehicles may take place is of the "dry" type; and included in this are half the Mediterranean basin and the greater part of those important countries lying between the Mediterranean and India.

II.

Let us now consider briefly the elements upon which depend that mobility which is essential to cross-country vehicles if they are to be used in war for continuous cross-country work, noticing some of the differences of general type called for in wet and dry countries. They are: (i) Agility; (ii) Reliability; (iii) Trained drivers; (iv) Capacity to carry load or armament; (v) Economy in fuel and water supplies.

(i) *Agility*.—This may be defined as ability to move fast over any of the various types of terrain; it is indeed the cross-country principle in essence. Mechanization, as an alternative to horses in the army, will depend largely for its success or failure on the degree of agility available. As defined above, it is seen to consist of two qualities—speed to out-manceuvre and to effect surprise, versatility to ensure speed in any particular theatre of operations. For a vehicle designed to give excellent performance over one type of country may fail utterly over another.

For agility over any particular type of country, several special qualities are necessary; only two, however, appear to be common requirements for both wet and dry countries. They are:—(1) Ability to move over uneven undulations which tend either to twist the vehicle transversely, or to foul some underneath portion of the chassis; (2) Ability to run continuously in low gear without overheating even in a following wind either on a long sustained hill or when pulling through heavy going.

Over wet country, as far as agility is concerned, only one other quality is demanded—ability to pull through mud. Speed is seldom considered for two reasons. First, it is in the nature of a wet country that passable obstacles except deep mud are man-made, and occur only at intervals between which the going is straightforward. Secondly, mechanized action in wet countries is so circumscribed by impassable obstacles that cross-country runs are very short. The actual speed of traversing obstacles is, therefore, of small importance.

Now consider a column of fighting and first-line vehicles marching across country in the dry 42 per cent. of the motorable world's surface. The column is on a 150 mile run and the nearest help of any sort is 70 miles away. No enemy action is anticipated. The route lies along the foot of a range of low bare rock hills, drainage runnels from which cross the route at right angles every few yards. The ground is a dry powdered clay covered with stones up to a foot in diameter. It is firm underneath, and is found to bed down well to form a hard beaten road. The runnels are not deep, but some disclose bare rock bottoms and some are choked with drift sand. Now and then a mile-wide wadi has to be crossed. Its bed is full of sand. Such going would be considered fairly easy by any Persian or Syrian driver.

This country discloses the "continuous obstacle" unknown in England. The passage of such a rocky boulder-strewn road entails a continuously tortuous course avoiding individual projections, while allowing others to pass underneath between the wheels or tracks, and twisting in and out for many miles on end. A head-on collision between a wheel or track and a boulder may mean a smashed axle or burst tyre. In England, to negotiate such country, orders would inevitably be given to proceed at five miles an hour in bottom gear. This is impossible on a 150 miles march, and it is unnecessary. Given light, easy steering and an experienced driver, 15 or 20 miles an hour may be counted upon. The first requirement is, therefore, light quick steering and a light front axle load; the second a clean clearance over the whole space between the wheels. Brake cranks, for instance, projecting downwards from the rear drums, as in many British cars and lorries, will soon be torn away.

The passage of a long series of drainage runnels at right angles sets up a fore and aft pitching which is a most severe strain on the springs. Very efficient shock absorbers are required.

Short patches of loose sand can, and must, be rushed at speed. Hesitation means getting stuck. Here again first-class steering is essential; else, in wheeled vehicles, the machine becomes out of control, the front wheels lock round and the vehicle is stuck.

The column now comes to the wide wadi filled with loose sand. The first essential is continuous movement. If a vehicle once allows itself to be pulled up dead, it will seldom start again under its own power, no matter how low a gear it uses. The driving wheels or tracks merely dig deeper and deeper. This is just the reverse of experience in mud where down below there is a firm bottom; if the treads will adhere to it a steady pull in very low gear will cause forward movement. In sand there is no bottom, but a good support to a soft pad-like thrust as of a camel's foot. Once the grains are disturbed, a heavy drag is experienced, which is far greater at low speeds than at high, and the force wanted to start motion is greater still. Halting is fatal. The requirements are, therefore, a large area of smooth soft tread to roll over the grains without disturbing them, a powerful engine, rapid gear-changing, a gear-box which will step continuously down to the lowest gear required without the necessity for halting to get into any special "sand gear" or "reduction gear." In the case of wheeled vehicles, the front axle must take as little weight as possible. Pneumatic tyred vehicles must be able to deflate and to re-inflate their tyres easily and rapidly to negotiate soft or hard going. Vehicles will inevitably stick in some sand. Towing is then impossible, as the towing vehicle will also dig in

and stick. Simple, light and rapid extricating appliances such as steel channels, rope ladders or thick belting are essential.

The passage of continuous obstacles is a great strain on a driver unless he is comfortable and unless his vehicle drives with the ease of a car. Difficult steering and gear changing will mean a reduction of 50 per cent. in the day's run, and probably a crash.

The most obvious criticism of the above remarks might be some comment such as this: "I really cannot foresee columns of army vehicles ever attempting the country you describe. It would just be a *tour de force*." The reply to this is: If our horseless army is to operate outside Europe, in a dry country, where roads are few, our vehicles must be able to move across the surface of the land, and the surface just described is very much the average. It is, in fact, quite easy country for mechanical vehicles. In East Persia ordinary American four-wheeled lorries do a normal run of 600 miles in three days over similar terrain, carrying gross overloads.

(ii) *Reliability*.—Freak machines can be produced to display great agility on demonstration, but these are very liable to break down. It is little use providing agile vehicles which cannot complete their day's run. In general, the more agile the vehicle, the greater strains will be imposed on all its members, different types of surface giving rise to severe strains in different members.

When considering reliability and repair, we again find very marked differences in what is required in wet and dry countries. The continuous jarring over low rocks projecting from the track throws a far greater strain on the transmission than any obstacle in soft ground. The effect appears to be cumulative. Springs last a certain time and then fail. Soft sand and boulders throw a very great strain on the front axle and steering. Overheating is more liable to occur when pulling through soft sand in a high temperature than at any other time. Tyres whose rubber is mixed to withstand only wet seldom stand up to rocky going, where the walls strip off in a few hundred miles.

As regards repair, the wet country with its thick population and numerous shops, favours the development of a somewhat complex inaccessible machine capable only of workshop repair. So the idea has grown up that repairing is a special trade quite divorced from driving.

In the greater spaces of the less civilized dry countries, the impotence of the driver to repair his own machine becomes a serious handicap. On long runs across country serious breakdowns are generally to be avoided by timely diagnosis, that is, the driver must be taught to observe premonitory symptoms while on the move. If a breakage

happens, a spare part must be available with the column, and the exchange made on the spot. This is what happens in commercial practice. The native driver knows his simple American lorry and can usually carry out his own repairs; he has no option.

(iii) *Training of Drivers.*—The driving of mechanical vehicles is generally coming to be regarded in the same light as riding a bicycle. On the tarred roads of England, or even on the open down-land which passes for cross-country work, this is not an unreasonable attitude. But are there not possible theatres of war which present more frequent difficulties than the occasional clay bank? If there are, can we expect to derive full benefit from our costly and laborious mechanization with drivers whose experience is limited to flat roads? Across country, indeed, the driver becomes an integral part of his vehicle. Without his skill the vehicle will sink into the ditch or strike the rock ahead. A driver must decide in the fraction of a second whether to go on or swerve aside.

Many officers, accustomed to the contemplation of the average transport driver coping with the simplest irregularities of his route, would be amazed at the skill of the expert picking his way swiftly and confidently over a hundred miles of boulders, sand dunes or jagged rocks of primitive hill tracks. It may be asserted that of the total cross-country performance of a vehicle at least 40 per cent. lies in the skill of the driver and the remainder in vehicle design. The importance of training good drivers for this class of work cannot be overestimated.¹

(iv) *Capacity to carry load or armament.*—Requirements of this nature must largely be governed by military considerations. For first-line and fighting vehicles, however, agility will inevitably fall off with increasing weight, especially over broken rocky country where nimble steering is necessary. On the other hand, in the case of second-line vehicles, where agility is of secondary importance, large unit weight means decreased road space and fewer drivers. Across the rough country previously pictured, the American four-wheeled lorry in Persia carries a five or seven ton load on six hundred mile runs over 6,000 foot passes. Their day's run is over 200 miles.

(v) *Economy of fuel and water.*—Fuel economy and the problem of fuel supplies are receiving much attention. Consumption over various types of cross-country surface, however, does not appear to have been compared and noted. It may vary as much as 100 per cent., and will greatly affect supply problems.

¹Establishments for training drivers for this class of work are now in existence. [Editor.]

In countries where distances are great, commercial practice has developed very large fuel tanks to avoid the decrease in cargo space otherwise caused by the carrying of refill drums.

The water question can never be seriously considered in England, and it is hard to realize how common it is in hotter climates for ordinary vehicles designed for home use to consume a greater quantity of water than fuel. It is, unfortunately, equally common for roads to be encountered where no water is available. Any wasteful consumption of water by vehicles is quite unnecessary if they are suitably designed and proper measures for conservation are taken.

III

We have now put forward a few of the points where design and training for wet and dry countries diverge, and where, by concentrating on manoeuvres and experiment in England, we are in danger of losing the advantage we appear to have gained by being foremost with mechanization.

Only after travelling over the great motor trade route of the Middle East from Meshed to Beyrout or wandering by car in Transjordan, Sinai or Western Egypt is it possible to realize how utterly cramped a mechanized force might be in wet, civilized, Europe as regards mobility and ease of manoeuvre. At home the bulk of military traffic must keep to the roads even were the rights of property to be abolished. None of the elements of mobility can be truly tested. Agility, as we have seen, is hardly required. Neither is reliability. Have we any accurate idea what percentage of casualties to our vehicles would occur on a continuous run of 1,000 miles across rocky country without repair facilities on the way? What proportion of drivers of all arms of the Service have ever driven across country at all? Are we certain that our latest vehicles will climb a continuous hill a few thousand feet high in a hot country and in a following wind without requiring more water than is normally to hand? Although we now have military vehicles abroad in India and Egypt, are we using them sufficiently to gain this across-country experience? In certain districts in India it is forbidden to take military first-line vehicles off the main roads.

Now consider the advantages of a mechanized force acting in the Middle East. The limiting factors to mechanized mobility in European war, rivers, canals, swamps and forests, and that bane of manoeuvres in peace, the rights of property, are here absent. Roads are not necessary. By far the greater proportion of the area consists of ground where a lasting road can be created merely by marking it out by the tracks of a pilot car. Soft sand is the exception rather than the rule and this can be

negotiated if proper technique is employed. Mountains alone may present impassable barriers ; yet even here the native with his camel or his ass has already surveyed and marked out all likely passages.

In dry countries, where in old days operations were impossible beyond a score of miles from water, we now see columns of commercial heavily laden lorries plying twice weekly throughout the year over 400 miles of waterless desert. This means that no area in the world is impassable through lack of water to an army conveyed in suitable vehicles that are already on the market. It is a mistake to argue on this point, as is sometimes done, that military vehicles would present a different problem to commercial lorries. With the ample water ration of five pints a day a lorry of 20 men carrying a 100 gallons of water would be self-contained for eight days. The necessity would however be unlikely to arise, for few parts of the world contain areas more than 70 miles from water. Fast, independent of water, capable of covering great distances without supplies, the motor vehicle can thus be seen to its fullest advantage in these vast dry countries, where the activity of the horse is seriously restricted by his requirements of water and forage. Even in the small area covered in the Third Battle of Gaza the cavalry was almost immobilised.

Here then is the problem in the event of a campaign being fought over terrain similar to the dry countries lying between Egypt and Afghanistan. That country is suitable for a mechanized force which, if properly designed, will also be suitable for use in wet countries, but not vice versa. Our mechanized army therefore should be designed not for use in Europe but in the Middle East, where ordinary vehicles of a more American design are in successful and daily use.

The solution of the problem will follow if we adopt a less insular outlook. Our source of experience should not be confined to England, but should be extended by the establishment of small but complete mechanized forces in Egypt, Palestine or Transjordan where unlimited manœuvre grounds provide every type of country not found in England, as well as enough mud to counteract any specialisation in the opposite direction. Useful experience should not be confined, as it is at present, to experiments on testing grounds. War conditions demand fast cross-country journeys of hundreds of miles as well as reliability. Neither demand can be satisfied by experiment during restricted manœuvres. War vehicles and equipment must be tested by long treks of a thousand miles or more made by a few assorted vehicles over country where there are no repair shops. Egypt and Transjordan lie within three days by air of London whence those responsible for design, both military and

civil experts, could come and gain a clear and balanced view of the varying surface conditions with which their products will have to cope.

Mention of manufacture brings us to another aspect of the problem. The British motor industry has been developed for the home market; so was the American industry. A glance back at the table of wet and dry countries will show at once why the American motor is supreme in the East. Their home market demanded cars for both wet and dry conditions: for the rainy, cultivated areas and for the stony, sandy, interior. Immediately after the war there was no mechanical transport in the East. The Americans realised the immensity of the Eastern market and seized the opportunity. Their own home market would be saturated in time, but here was a population of hundreds of millions with a passion for travel of which the extraordinary expansion of the Indian railways was a sure indication. Their home design was already suitable.

With fatal indifference to foreign conditions and following the policy of "Take it or leave it; it's British, and if you don't like it, it's because you don't know what's good for you," the British motor industry allowed foreign cars and lorries by the thousand to pour into the East. It is a vicious circle. With no Eastern market the British motor industry is acquiring no experience of what is required. Yet by an active military policy of long distance experiment and trial of British vehicles in the Middle East, a stimulus would be given to the industry to produce vehicles more suited to general world conditions. The Army would benefit by direct experience and by the creation of a reserve of commercial vehicles suitable for use in war. Industry would gain by the advertisement given by British motor activity in countries where British vehicles have never been seen since the war, and by a gradual change of design which would enable it, if it had the will, to compete in the unlimited Eastern market.

The Army should not remain inactive in the matter. The English commercial vehicle on which it must rely largely in war is still very much specialised to home conditions. Nevertheless it does not follow that all future wars will be fought in Europe. A new factor has arisen; deserts are no longer any sort of defence against a suitably mechanized army. In Eastern Europe factories are being set up to produce in mass the latest and best type of American vehicles ideally suited to dry conditions. Shall we live to see a mechanized army over-running Persia and the deserts of Baluchistan while our own falls by the wayside looking in vain for its accustomed mud?

THE INDIAN LINK IN THE CHAIN OF OUR IMPERIAL AIR ROUTES

By WING-COMMANDER W. A. McCLAUGHRY, D.S.O., M.C., D.F.C., *p.s.a.*

THERE are three potential airways which link Great Britain to the East. The Arctic route, the Siberian route and the route over Europe and Southern Asia. Australasia is joined by an additional link, the potential airship route across the Indian Ocean.

Each of these routes has its advantages and its drawbacks. The Arctic enables the distance, for example between London and Tokyo, to be reduced by some 3,000 miles over the present route via India, it also offers considerable advantages to the airship: on the other hand, the organization of a heavier-than-air service by this route is beset with difficulties. The Siberian route is over foreign territory, and Great Britain can never expect to develop her communications across these regions. The austral route across the Indian Ocean can be made an "all-red" one, and will enable the trade winds to be used, but inherently it must always be confined to airships. Thus we are left with the Southern Asiatic route, the only one by which British aeroplanes and seaplanes can pass to and from Great Britain, and the East and Australasia. It is our purpose to examine the importance of India in this Imperial Airway.

Commerce.—Situated round the Indian Ocean is nearly three-quarters of our Empire's population, and through these seas passes traffic vital to the life and the prosperity of the Commonwealth. India itself has a far larger population than all the rest of the Empire combined; she is also the largest individual customer of Great Britain. It is probable that railway communication between these regions and the British Isles is ruled out for all time, and the limit of speed of sea transport seems to have been nearly reached. Indeed, mail steamers are already run far beyond the economical limit.

Our civilization demands an ever-increasing speed in intercourse, and the Empire's doom is sealed if its communications fail to keep pace with the march of progress. Air transport alone offers the solution to this problem. Thus we see that India, lying as she does, between Great Britain, the Far East and Australasia, is destined to play a controlling

part in the commercial airways of the Empire. The internal air lines within the country will also have a dominating influence on the solution of the problem. This development will be merely a matter of time, for air transport surpasses all other forms of transport in providing facility and comfort in a country where heat and dust are intense and journeys long and wearisome.

After many buffets of political fortune the first air link has been forged, and the London-Karachi mail service now runs with remarkable regularity; and although political difficulties have arisen in fitting together all the air links to the East, plans are well advanced for the extension of the route to Calcutta, Burma, and thence to Australasia and Hong Kong. This trunk line will have the effect of contracting the Empire and will, eventually, bring India within three or four days, and Australia within nine or ten days, of Great Britain.

Defence.—Coupled with commerce is the question of defence, and from this aspect it is clear that India must always be a paramount link in the Imperial Air Route to the East; without it real strategical mobility of our air forces in the spheres to the East of Iraq would be impossible.

The defence policy of the Empire rests, ultimately, upon the mobility of striking forces which are based on various strategical centres. The geography of our possessions and political commitments dictates the weight of our air forces being stationed in the United Kingdom and the Middle East. Thus it is clear that any air reinforcements required in the East or Australasia must pass via India.

To take a concrete example: the key to the East is Singapore, for it guards the entrance to the Indian Ocean from the East and secures our maritime communications to Australia. The naval defence of this base with our present strength is, indeed, a formidable task; our principal fleets are in the Mediterranean and the Atlantic Ocean, where the margin of safety is already small, and their despatch to a distant theatre would not be practicable in times of war. The "period before relief" can be reduced to safe dimensions only by the despatch of aircraft from India or from the Middle East, through the Indian link of our communications. Again, in the event of operations in Europe, or some other Western sphere, the air forces of Australasia could not reinforce those of Great Britain by air without the link through India.

The defence of India itself, therefore, requires that the country should have connecting airways with the remainder of the Empire. India has the problems of protecting local shipping, of internal security, and of the defence of her Northern Frontier, the most vulnerable frontier of the whole Empire. Security can be enhanced and economy in

expenditure obtained if facilities exist for the mobility of our air forces between our strategic centres.

Air Routes across India.—Before concluding, the routes which aircraft will follow across India might be outlined. A glance at the map will show that Karachi is destined to be the Western, and Calcutta the Eastern, airport of India. The aeroplane route connecting these two ports will follow the general route of the railways which run via Delhi. There are two alternative ways for seaplanes and flying boats, one along the Indus and thence the Ganges, and the other round the coast line. It is a matter for conjecture which of these routes will eventually be followed, but as the reliability of aircraft increases, it is probable that the Northern one will find favour.

Conclusion.—In conclusion it may be claimed that India is as important a link in the Imperial Air Communications as the Mediterranean is to sea communications. The mobility of aircraft to the East must be developed to the full, and this can only be done by the establishment of a chain of airways via India—an end which will be accelerated by the growth of air transport throughout the Empire.

THE TERRITORIAL ADJUTANT AND HIS WORK

By CAPTAIN G. G. R. WILLIAMS, The Loyal Regiment.

AT the present day over one hundred and fifty Regular officers are holding the appointment of Adjutant to a Territorial infantry battalion. In addition, a large number of artillery, engineer and departmental Regular officers are similarly employed with Territorial units of their own branches of the Army. The task of these several officers is to act as expert advisers in the great work of training what may now be regarded as the main body of our Imperial forces. The Territorial Adjutant thus fills an important and responsible position.

The majority of officers volunteer for these appointments. Yet it may safely be asserted that, when doing so, only a small number can realize the nature of the duty they may soon be called upon to assume. This is not surprising since there is small opportunity for ascertaining beforehand what the duties of a Territorial Adjutant may be, although it seems imperative that candidates for these posts should have some idea of what lies before them. Yet only by facilitating the acquisition of such previous knowledge will it be possible to avoid the square peg finding himself in a round hole, with harmful results both to the efficiency of the Territorial and to the reputation of the Regular.

We will, therefore, attempt to assist would-be Territorial Adjutants by describing roughly the course of events in the Territorial Army during the space of one year, which, owing to the nature of Territorial training, opens on 1st November.

"The duties of the Adjutant are too numerous to mention," run the standing orders of a certain battalion. These duties, it is true, may be so varied as to defy compression into a brief description. The actual details of the Adjutant's work, moreover, will be found to vary in different battalions according to the peculiar nature of their location and component personnel. It would be idle to try and legislate for all units according to a single model. But the broad outlines of the Adjutant's duties appear to be so very similar in so very many cases as to admit of being described in general terms.

Before starting on this task, however, it is as well to emphasize one fact, which may prove to be the origin of the majority of the difficulties confronting a Territorial Adjutant. We are told that no man can serve two masters with success, yet this is the first thing an Adjutant has to learn to do because both his Commanding Officer and he will always serve two masters, namely, the Regular Army and the Territorial Association. The latter administers the unit, while the former, represented by the Regimental Paymaster, the Brigade and the Division are responsible for all forms of training and the disbursement of all Army, as opposed to Association funds. This service of two masters is not always easy, nor is the line of demarcation between the Army and the Association always readily defined. If at the end of a tour of duty, an Adjutant can say that he has faithfully served both masters to the best of his ability, he can feel satisfied that in this respect he has done well.

We will now take our year.

November-December.—This is probably the quietest time of year for the average Adjutant since his work will mostly consist of office work by day, it being too early in Territorial year to hold drill nights for the men. Some officers will be sitting for the written examination in Certificate "A" and will be undergoing their final preparation by the Adjutant for that examination which is held about the 14th November. There will also be the final orders and instructions to issue for an Armistice Day or Armistice Sunday Parade, remembering always that in the Territorial Army a battalion order cannot merely be issued on the day before the battalion parades as is the case in a Regular unit. Orders have to be issued and circulated on post cards, or by some other means, at least fourteen days in advance, that is, if a good attendance at a parade is expected. If there are outlying stations, the question of how men are to be brought into headquarters has to be considered, and, when that has been thought of, the manner of paying for their transport has to be settled, if, as is possible or probable, the train service is unsuitable. This, his first battalion parade, will make an Adjutant realize that there are innumerable problems affecting the Territorial Army such as are not encountered in the Regular Army, and that the work of the Adjutant is not so simple as it might appear. From this parade until Christmas there will be the usual office routine with one or two nights a week in barracks. As the memoranda on training arrive from Division and Brigade, the question of the coming year's training, both individual and collective, will require thought. Courses and attachments for the permanent staff should be done during the winter months where possible, as the services of that staff will be fully required during the Spring and Summer.

January-March.—After Christmas and the New Year, there will be a gradually increasing amount of work to be done until camp. In February there will be Winter classes for N.C.O.'s in weapon training, section leading and Vickers gun.

Estimating the cost of these classes, for scheduling against the Territorial training grant, obtaining authority to hold them, which authority must previously be obtained in all cases where pay is involved, and arranging the programmes for them will occupy many hours and when the classes start, four nights a week will be required in barracks either at regimental or detachment headquarters. Such classes are more easily controlled if held centrally, provided that such a system can be reasonably carried out, though larger attendances can possibly be obtained if classes are decentralized. But in the latter case the problem arises as to whether a sufficiency of instructors is available for a "travelling circus" without working seven days a week. The question of providing tram or bus fares, in cases where the issue of warrants is impracticable, is a problem. Regulations state that cash must not be handed over to an N.C.O. for any purpose, whereas the Adjutant cannot be in several places at the same time to pay out fares of men coming in to headquarters.

During these months some form of individual orders for the year, to include musketry camps, tactical exercises with or without troops, section leader week-ends, etc., will be revised and issued to all ranks. As this involves arranging the whole training year, the annual programme will be revised at the same time. This should be issued by the end of March, if it is to be of any use, though a few minor amendments may be required later. There should be no misapprehension on the part of any Adjutants elect that the arrangement of the principles of training are solely in the hands of the Adjutant. This is not and should not be the case. It is only after considerable consultation with his Commanding Officer that the Adjutant should attempt to complete the details and produce the programme in the required form.

April-May.—In units where men do their drills at fixed periods, decided not by themselves but by the Commanding Officer, these two months will be confined to the preparation for, and completion of, the annual courses in musketry and Vickers gun, every man being required to complete a certain number of compulsory drills during this period. The Adjutant will attend all musketry week-ends, whether run under company arrangements or otherwise. These week-ends do not count as drills because, provided that a man qualifies, he obtains a portion of his proficiency grant for his attendance. It is recommended that this portion, ros., should be paid out to the man during the week following

his own company musketry week-end, provided of course that he attends and qualifies. Absentees who fire at some other week-end should be kept waiting until the final settlement of outstanding bounties at the end of the year after camp. There are few men who cannot spend a selected week-end on the range, if they are warned in good time.

During this time also recruiting should be in full swing, so that the permanent staff will be fully occupied in training recruits, attesting others, and in fact trying to do several things at once. At the end of May enquiries should be commenced into the matter of absentees, such as men who have not appeared for musketry or men to whom letters have been sent but from whom no reply has been received either in person or in writing. This may involve calling in the assistance of the local police, but this action is worth the trouble. It is useless for a unit to be up to strength if men are going to be absent from camp or fail to complete their drills. Incidentally this early pursuit of absentees may save the unit paying for lost kit and equipment. There is only one way to deal with the man who does not fulfil his already limited obligations, namely, for the Commanding Officer to recommend his discharge.

June-July are the busiest months in the year and the most interesting, but leave the Adjutant little spare time for his usual Summer pursuits. Drill nights continue, especially for the training of N.C.O's and recruits, and the first recruits' musketry week-end will take place for the earlier recruits, who should be ready for it. In addition there will be tactical exercises, with and without troops, to discuss with the Commanding Officer. These have to be elaborated on paper and finally carried out at week-ends. In addition, estimates of the numbers likely to attend have to be made, conveyances have to be ordered and arrangements made with the Quartermaster about food. If numbers are over-estimated, the Quartermaster will not be pleased, if under-estimated, the troops will not be satisfied. Brigade authority will have to be obtained to hold these trainings, if not already asked for, since without it the varied and various allowances to pay expenses will not be claimable. It is by no means easy to make both ends meet, and although the Adjutant is not allowed under any circumstances to handle monies received from the Territorial Association, yet he must be closely connected with them and have a good knowledge of them, since he is intimately concerned with the amounts that the unit can claim on account of attendances at parades and training.

During these months preparations for camp become intensive. All men have to be warned individually to attend, while public notices as to the place and date of camp must be published. The number of

drills completed before camp must be carefully watched, as any man who attends camp without completing one-half of his obligatory drills before going, is not entitled to pay during camp. Should he be paid in error, there will be considerable difficulty in recovering that money, although, as far as the Adjutant is concerned, it will be immediately disallowed in the pay list for the camp period.

Most men will complete all their drills before camp and, if they are keen, frequently many more besides ; but others will always be a nuisance and need watching. The Regulations state that provided ten compulsory drills are completed before camp, in order that the man may qualify for pay, the remainder may be completed after camp and before 1st November. This should, however, be avoided as far as possible, because drills completed after camp are useless from a training point of view.

During July, after the Brigade has received its training areas, it may be possible to visit the camp site and training areas with the Commanding Officer. After this visit the Commanding Officer will decide on his camp programme and the lessons he intends to teach, as well as the areas he intends to allot to his companies. The programme will then have to be completed and submitted to Brigade and the orders for camp, and for the move to camp, will have to be prepared and issued. We will draw a veil over the last few days before camp except to say that all Adjutants probably wish that a telephone only existed for the purpose of calling up other numbers instead of other numbers calling up his own.

Finally the day itself will arrive and probably at a very early hour in the morning or very late at night the unit will parade for camp. If there are detachments which entrain at other stations, and even possibly proceed by separate trains, it will not be known until after arrival in camp how many men are present and what absentees there are, or why. Telegrams to the police for men absent without leave, if the steps suggested above for keeping in touch with doubtful starters have been taken, will probably produce the man in person, or a sound reason for absence in the form of a medical certificate. Always remember that no reasonable employer, if approached the right way, is likely to refuse a man leave to go to camp for at least eight days. But if by nature of his employment it does happen that a man cannot go to camp, he is of no use as a Territorial soldier and the sooner he is discharged the better. For the Adjutant camp is similar to that in the Regular Army, except that, having in many cases less experienced officers to deal with, there is more to think about and more to observe.

Training being the chief object of camp, there will be times when office work in the orderly room has to wait. The efficiency of the

orderly room clerk will be tested and in the measure of his efficiency so will the Adjutant's work in the orderly room be increased or decreased.

The pitching and striking of camp is carried out by the advance and rear parties respectively under the supervision of the Quartermaster in infantry units. Artillery units, having no Quartermaster in a Brigade, are at a great disadvantage in this respect. The Quartermaster, being usually an old soldier, manages in a day or two with very few men to get the job done with great success, even to the point of whitewashing stones and guard ropes before the arrival of the battalion.

Time passes quickly in Camp, and all too soon the last day arrives and with it entrainment for home. It seems regrettable that the unit will not be on parade again for a year at such strength. On arrival home rifles are handed in at the respective drill halls, kit bags are issued and the troops disperse to become civilians once more.

After Camp.—Now comes the aftermath for the permanent staff: paper, army forms and accounts of all varieties and descriptions. Company pay lists have to be embodied in the unit pay list for the camp period, the pay list closed and forwarded to the Paymaster, and forms have to be sent to the Territorial Association to show how many men and horses were in camp each day, how, when and where they went to camp and what kit and stores were taken—each master wanting everything at once.

The Brigade Commander's annual inspection, previous to which the annual battalion report including confidential reports on officers must be prepared and forwarded, will take place probably shortly after camp, while at the end of the month there will be a final musketry week-end for recruits.

After this there should be a period when the Adjutant can take a short leave and his orderly room clerk will also wish to take his leave. This is a suitable time, because when the pay list is closed, it will not be returned until September, as the pay office is unable to complete all pay lists at one time. The usual conundrums will of course crop up in due course in the form of "R.P." observations.

September-October.—These months are chiefly occupied in getting straight and closing up the year's finances, musketry and other returns, such as a return of non-efficients for the year, to the Territorial Association, the completion of drill books and the preparation of new ones for the coming year.

So ends the Territorial year. Some may wonder what a Territorial Adjutant can find to do, when he has no men in barracks to occupy him. But any officer, who so thinks and is looking for a quiet and peaceful

appointment, is strongly advised not to apply for a Territorial adjutancy. If a Territorial Adjutant does his duty thoroughly and conscientiously, neither his nights nor his week-ends from February to August will be his own, while there is enough work to do all the year round to keep him occupied by day. One Adjutant stated that if every prospective Territorial Adjutant knew the magnitude of the task he was assuming, he would resign his commission rather than take over the appointment. But this greatly over-states the case as to the bad points, since it is both a very interesting and responsible appointment. The Adjutant of a Regular unit always has his Commanding Officer at his elbow to consult in any difficulty. The Territorial Adjutant has no such good fortune, for his Commanding Officer cannot always be available, even on the telephone. Consequently he has to consider carefully what his Commanding Officer's views, and not his own, would be before drafting a letter for the Commanding Officer to sign, or for his own signature on his Commanding Officer's behalf. There will be too many decisions which the Adjutant will have to make, which time will not permit of being referred to his Commanding Officer.

In conclusion let it be said that, if due consideration is given to the amount of work that a keen Territorial soldier puts in, after his civilian business is finished for the day; that he gets little or no pay for his services except in camp; that for many of the men time spent in camp is their only annual holiday from business, surely it should be a point of honour for the Regular officer, who is appointed Adjutant, to do everything in his power to encourage this enthusiasm and to increase the efficiency of all ranks in any way that he can. If he is not prepared to do this, he is of no use to the Territorial Army and the Territorial Army will have little real use for him.

NIGHT ATTACKS ON HARBOURS

By COMMANDER N. C. MOORE, D.S.O., M.V.O., R.N.

THE importance of harbours has long been realised by maritime nations, with the result that from the earliest days many have been fortified so as to make them a very difficult object for sea-borne attack. The nature of these fortifications, simple at first, has become more complicated during the XIXth and XXth centuries. Before this period, guns mounted behind masonry and earthworks were the principal defence. Boom defences were known and used, but chief reliance was placed on the gun. The protection of the gun, thus mounted, was much superior to that of the gun carried on board ship, and consequently we find that, in most cases, the forts were able to prevent the near approach of men-of-war in daylight. Modern methods of mounting shore guns have not redressed the balance very much; the fortress gun, mounted as it is behind earthworks, and rendered as invisible as possible, is a very small target; moreover, a hit on the gun emplacement itself is necessary to put it out of action. The ship gun, on the other hand, is mounted in a ship which is easily visible, and hits anywhere on that ship make definite progress towards the destruction of the guns mounted in her. Again, the space available for ammunition on board a ship is limited, and reserve stocks are probably not immediately available. For the shore mounted gun, it is solely a matter of organization of supply to enable the gun to continue firing until the piece is worn out.

In addition to guns, defences now include observation minefields, booms of a complicated nature, and local patrol defences, submarines, small torpedo craft, and aircraft. The superiority of shore mounted guns over ships' guns has been shown in too many operations and is too well known to need elaboration here; taking into consideration the other forms of defence now available, it may well be assumed that attack on a harbour is one of the most difficult operations of war.

It is, however, worth considering how such attacks succeeded in the past, and whether there are any lessons to be learnt from them which may guide us in the future. History shows that the solution of this problem has usually been found in a large combined operation, where troops were landed to attack the harbour from the land side, while the fleet blockaded the port and kept the line of communications open for

the army. But it is not the intention in this paper to deal with this vast subject of combined operations, but rather to investigate the methods that have been used by sea forces alone. Reviewing this latter type of operation, the student will at once notice that the majority of such attacks were made at night. Although, at first sight, night conditions seem obviously best, there are disadvantages, as well as advantages. For operations against a harbour or ships in a harbour, darkness alone gives a measure of security against the approach being seen. It is true that nowadays it is possible to simulate night conditions by the use of smoke clouds, but this depends on the direction of the wind, and whether the craft making the smoke can approach the harbour. Concealment of the attack obviously reduces the danger from the guns of the defence, and gives the best chance of inflicting surprise upon the enemy. On the other hand, the difficulties of handling ships in the narrow waters of the approaches to harbours are enormously increased by darkness. It must always be remembered that the usual aids to navigation, which by night are all artificial, will almost certainly be removed altogether, or their position changed, until navigation under these conditions becomes impossible.

Night attacks on harbours have been undertaken for a variety of objects, some of the most important of these being to force a sheltering fleet to put to sea, to cut out a special ship, or, more recently, to block a harbour by sinking ships in the entrance. In the days of wooden ships, the first of these was generally attempted by the use of fireships, sailed or drifted in on top of the anchored fleet. Success depended largely on weather conditions and the element of surprise, and where these conditions were favourable, the object was generally achieved. In the case of the Spanish Armada at Gravelines, such was the panic caused by the appearance of the British fireships that the Spaniards cut their cables and proceeded to sea in disorder. As, however, the size and number of the boats carried by men-of-war increased, advantage began to be taken by the defence of the helplessness of the fireships, and in the XVIIIth century we find many attempts to employ that form of attack frustrated by patrolling boats, which towed the fireships out of harm's way. The use of booms across harbour mouths, where conditions rendered this possible, also proved a good defence against fireships.

In cutting out operations, which aimed at the capture rather than the destruction of the ship or ships attacked, fireships could not, of course, be used. Boats with boarding parties were usually employed, and great precautions were taken to ensure silence and secrecy until the objective was reached. The vulnerability of the boats to fire from a ship's guns rendered repulse certain if the attack was discovered before the boats were close alongside their quarry.

An interesting example of a night attack is that carried out by Rear-Admiral Horatio Nelson at Teneriffe on 25th July, 1797. Here the object was a Spanish treasure ship, known to be in the harbour of Santa Cruz; but this was to be achieved by the capture of the town itself. The squadron consisted of three ships of the line, three frigates and a cutter. As the place was well fortified, Nelson proposed to arrive after dark on the 22nd July, and sending his three frigates close inshore, to land a large force of seamen and marines under Captain Troubridge to capture the fort and high ground behind the town. This original plan was defeated by the fact that, due to a gale in the offing and contrary currents, the frigates could not get close enough inshore to land their parties before dawn. At daylight the Spaniards discovered the British squadron, so all chance of a complete surprise was lost. Although the landing parties went ashore, the enemy was found to be so well prepared and in such strength that this form of attack was abandoned, and the parties returned to their ships. But such was Nelson's temper that he decided to increase the size of his landing party, and to make a direct assault on the mole on the night of the 24th-25th July, which he would lead himself. Unfortunately, a strong onshore wind was blowing, and on the night of the attack only five of the flotilla of boats found the mole. The remainder had to land on the beach through a heavy surf, which broke up the boats and wet the ammunition. The mole was captured by the boat's crews who found it, but this small force was almost overwhelmed by fire from the shore end, where the Spaniards were awaiting the attack, and eventually they had to retire to the ships. It was only by a piece of the most courageous bluff on the part of Captain Troubridge, who with 350 men threatened to burn the town in the face of some 8,000 Spanish and French troops, that the rest of Nelson's force was also able to re-embark. Undoubtedly in this case the attack was defeated through lack of surprise and adverse weather.

In the XIXth century the tremendous developments in material seemed to alter conditions of harbour attack entirely. The advocates of the torpedo boat hailed this type of craft as the ideal one for attacking a harbour, and sea front defences of quick-firing guns were mounted as an antidote. Booms of various designs were tried, until some types were evolved that, it was thought, would stop even the torpedo boat. But it was, perhaps, the introduction of the searchlight that altered conditions most. This provided a means of detecting attacking craft at some distance and, combined with quick-firing guns, seemed to supply an excellent answer to the threat of torpedo boat attack. Events in the Russo-Japanese war tended to confirm this opinion. It is true that the opening action of that war resulted in the damage of several Russian battleships in a successful night attack by Japanese destroyers; but it

must be remembered that the Russians were expecting a dummy attack by their own torpedo craft, and that no declaration of war had been made. The defence was in no sense prepared. During this war, the Japanese made no less than three separate attempts to block the exit from the inner harbour at Port Arthur. Each was defeated by the lights and guns of the shore defences and of the ships anchored outside. But it is particularly noticeable in all these operations that there was no attempt by the Japanese to back up the entry of the block ships with active support by their heavy ships or by a secondary attack to divert the attention of the defenders.

When, however, we pass on to the events of the European War, we find that developments of material, and especially the applications of chemical warfare, rendered attacks on harbours once more a practical proposition. Artificial smoke was a useful antidote to searchlights, also to star shell—another innovation; while the coastal motor boat—a high speed torpedo carrier of very small size—seemed to promise realisation of the dream of the torpedo-boat enthusiasts of the middle of the previous century. Further, aircraft with their capacity for attacking from above, as distinct from a surface level, gave more opportunities for a diversion.

The attack on Zeebrugge in April, 1918, and the attack on Kronstadt in August, 1919, are models of well organized attacks on harbours with modern weapons. Both these fortresses were so well protected by guns and searchlights that they were considered impregnable by their defenders, yet in the case of Zeebrugge blockships penetrated into the narrow entrance to the Bruges Canal, and in the case of Kronstadt severe damage by torpedoes was caused to the Russian ships lying inside the harbour. These operations are too well known to need recapitulating, but it is worth while comparing their main characteristics with those of previous operations of a similar nature.

At Zeebrugge, the comparatively narrow entrance to the harbour was flanked by a mole a mile and a half long, and strongly defended, not only by guns mounted on this mole, but also by those of destroyers and other vessels berthed alongside it. Moreover, the whole coast of Belgium from the Dutch frontier to Nieuport bristled with guns of all calibres from 15 to 5.9 inch. It was obvious that, if discovered, the tremendous fire that could be brought to bear on her would sink any blockship before it could pass the mole and enter the inner channel. Elaborate plans were made to meet these difficulties. First, in order to eliminate the gunfire of local batteries, smoke was loosed over a large area of the surrounding coast; even so, a shift of wind at the last moment deprived the attack of its protection during the final stages, but it rendered the approach possible. Secondly, with the object of capturing the mole

batteries and preventing them sinking the blockships as they passed, an old cruiser, the "Vindictive," was specially fitted and armed to go alongside the mole, and to land storming parties. To protect these from overwhelming attack by forces which might be brought against them from the mainland, a submarine filled with high explosive was used as a gigantic torpedo to isolate the mole. Lastly, in general support, and in order to cause fires whose light might assist the attack, monitors mounting 12 inch and 15 inch guns, and all available aircraft fired on the batteries and bombed the harbour works. Thus supported, the three blockships were enabled to pass into their objective, and although the first fouled a boom and ran aground, she cleared the way for the two succeeding ships, who blew themselves up across the entrance to the Bruges Canal according to plan.

It is interesting to notice how this plan improved on all previous attacks on harbours, and was destined to meet and overcome the difficulties that had rendered them abortive. To begin with, the blockships themselves: at Port Arthur they had been defeated by lack of support and by the lights of the defence; at Zeebrugge smoke obscured the lights of the defence until the last minute, and the shore guns were hotly engaged by other sea forces. Furthermore, an alarming diversion—the mole attack—took the defenders' attention away from the arrival of the blockships. Then, as regards the storming of the mole: at Teneriffe, Nelson's boats came under heavy fire at half gun shot, which sank a small ship commandeered to supplement his ship's boats, and seriously crippled the attack; at Zeebrugge a cruiser was used to land the storming parties, and she was of such a size that it would have been nearly impossible to sink her in the short time she was likely to be seen and be under fire before gaining the shelter of the mole itself. Again, at Teneriffe, although the mole was captured, the British were compelled to re-embark by the attack which developed from the land end; at Zeebrugge a breach was made in the shore end of the mole to prevent this danger.

Lastly, at Teneriffe, inability to secure surprise and bad weather contributed largely to the failure. The expedition to Zeebrugge set out, and was withdrawn on two occasions, because the weather conditions became unfavourable for the use of smoke and small craft, but in neither case was it observed by the enemy.

Nevertheless, not all the attempts at blocking harbours by night were successful in the last war. At the same time as the operation at Zeebrugge was taking place, another at Ostend was a complete failure. The cause of this is noticeable, as it illustrates one of the vital problems in an undertaking of this nature. The difficulty of successfully navigating

blockships at night to the point where they are to be sunk is always great, and may be rendered even greater by enemy action. At Ostend, the Germans had very recently altered the position of the buoy from which the blockships intended to take their final course. This fact had passed unnoticed by the British forces, with the result that the blockships' course from the moved buoy took them on to a shoal. A second attempt was made on 10th May, 1918, the cruiser "Vindictive" being used. On this occasion, no diversion, other than a bombardment from sea and air, was made; moreover, the enemy had been thoroughly aroused by the attacks of some three weeks before. Once more, navigational difficulties delayed the approach of the blockship, and this enabled the enemy to concentrate a devastating fire on the ship. The Captain was killed and the Navigating Officer badly wounded. At the last moment the second-in-command did his best to get the ship, now nearly unmanageable, across the channel, and sink her; unfortunately, she was not sufficiently well placed to cause a serious block, and was hauled out of the channel by the German salvage craft a few days later. The casualties in this affair were much heavier than had been the case in the blockships at the previous attack on Zeebrugge.

The later operation at Kronstadt took place after the Armistice, and was designed to immobilize the Bolshevik fleet in the harbour of Kronstadt, and so prevent their active use against the few light forces that were operating in the Baltic. Kronstadt has always been considered one of the most strongly fortified places in Europe. On the island itself are mounted a number of guns, and from the island to the Finnish shore to the Northward are a chain of forts, joined together by a wall built on the sea bottom, the top of the wall being covered to the extent of a few feet. All the water to the northward is shoal, while the deep water channel to Kronstadt approaches from the eastward along the South side of the Island and so on to the mouth of the Neva. This channel, in 1919, was protected by minefields which could only be swept under the guns of the fortress, which commanded it.

The attack was carried out on the night of 17th-18th August, 1919, by eight coastal motor boats. The entrance to the harbour was only some 150 feet wide, so the first difficulty to be solved was how to approach unobserved. This was achieved, first, by a diversion. Aircraft operating from a seaplane carrier and a shore base attacked the harbour and the chain of forts with bombs. This had the desired effect of distracting the attention of the defenders from the coastal motor boats, and of inducing all except the anti-aircraft gunners to take cover. While the air attack was in progress, the boats passed through the line of forts to the North of Kronstadt, and made for the entrance, approaching

from the westward, the direction from which attack was least expected. Complete surprise was effected, and the first two boats to enter the harbour torpedoed two of the Russian ships. The remaining boats were not so successful as the defence was thoroughly aroused by the attack of the leading boats, but five out of the eight boats returned, and the British casualties were surprisingly light. The Russians had two battleships put out of action, and a submarine depot ship sunk, which prevented any molestation of the British forces for the remainder of the year.

There are several points worthy of remark in the few examples of harbour attack that have been quoted. The importance of exploiting the principle of surprise is to be noted in every case ; not merely surprise due to an unexpected attack, but that which arises from the very audacity of the plan and the means adopted for its execution. New weapons, or new methods of employing old weapons, attack from an unexpected direction, or even perhaps an attack in weather conditions that appear unsuitable may be used to exploit this principle. But whatever form it takes, surprise is seen to be an essential preliminary to success, yet it may tax the judgment of the officer commanding the attack most severely, for if through any cause the element of surprise is lost, what is he to do ? It may be lost through observation by enemy aircraft, or by surface craft ; it may be endangered by a change in weather which will nullify the effect of smoke screens. In many cases, premature discovery may lead to defeat, and the preparation of weeks be brought to nothing. On the other hand, it is always possible that the enemy's report of the impending attack may not get through to his defence in time, and weather conditions may change for the better at the last moment. Leadership and judgment of a very high order are required to cope with such a situation, to weigh the chances of success or failure, and to decide whether to abandon the attack or to press it home.

Another point to be noticed in connection with such operations is the almost invariable practice of using ships or weapons of a kind not generally required for fleet work. Fireships, bombs—the name by which small gunboats were known in the XVIIth and XVIIIth centuries—monitors, blockships, and coastal motor boats have all been employed with success. But to collect such craft takes time ; in future it may even be necessary to build the ships required, and it is always necessary to prepare blockships with demolition charges, and fill them with concrete ballast. Consequently the night assault of a harbour is an operation which requires careful preparation both of plan and of materiel, and cannot be undertaken at a moment's notice.

The value of a diversion has been mentioned in connection with the attacks on Zeebrugge¹ and Kronstadt, and it seems that its value cannot be over emphasized. Aircraft have already proved their utility in this role and future developments may render their employment even more important than before in the attacks on harbours. It is possible that smoke screens and lighting may be provided from the air, while the effect of bombing attacks will increase with the development of bomb sights and of the aircraft themselves.

It seems therefore that the main points arising from a study of the history of night attacks on harbours are :—

- (1) That surprise is a necessary adjunct to success ;
- (2) That new weapons and special types of vessels are likely to be required ;
- (3) That a straight forward frontal attack has little chance of success.

Developments of weapons and vessels are always taking place ; and even now many of those first used in the War have advanced far beyond the stage when they were last used in action. To what extent, then, can we foresee future developments in the execution of this type of operation ?

Perhaps the factor that is most likely to affect the problem is the aeroplane, and it may be of interest to discuss its possibilities. Firstly, it must be remembered that hitherto it has only been used in such operations as an aid to other weapons, but, is it capable of ever developing the main attack by itself ? There are two principal means whereby it may do so—by the use of torpedoes or bombs. In the case of the former it competes with existing torpedo carriers, such as the destroyer and coastal motor boat ; as regards the latter, to a certain extent it competes with the heavy shell fired from guns. As a torpedo carrier, it suffers from certain limitations. To begin with, the weight of the torpedo which it can carry is always likely to be limited to some extent, while again, the heavier the torpedo the less the lift available for a defensive armament, petrol, etc. Again, an aeroplane has to descend to a very low height above the water in order to release its torpedo. It thereby loses much of the advantage of the third dimension as giving immunity from gunfire. Further, it is extremely difficult to judge height above the surface of the sea in the dark, and this makes it most

¹ The attack on the mole has been called a diversion. It must be remembered that it was not so intended originally, and only became so when the " Vindictive " moored too far down the mole to attack her original objective, the mole Battery. The value of this attack then became that of a diversion.

difficult to ensure success in launching the torpedo. If lights are used to illuminate the surface so as to assist in judging height, they will also illuminate the attacking aircraft, and some of the element of surprise may thereby be lost.

The coastal motor boat does not suffer from such limitations; moreover, she can easily carry two full sized torpedoes. But the aeroplane has the advantage in superior mobility, greater radius of action, and independence of the state of the sea. It seems, however, that in practice these two torpedo carriers should be regarded as being complementary to each other, rather than competitors. In some cases conditions may favour the use of the aeroplane, in others that of the motor boat. It seems improbable that either will supplant the other entirely. Normally, a combination of both forms of attack may prove most effective.

But it is, perhaps, with bombs that the aeroplane may, in the future, be able to achieve the night attack of a harbour without the aid of other vessels. Although it has been mentioned that the aeroplane bomber is a competitor of the big shell, it is perhaps true that for these operations the competition is won rather easily by the aeroplane. Firstly, as regards the position which the attacking force must reach to come into action: here the advantage is so heavily in favour of the aircraft that competition can scarcely be said to exist. Guns must be brought and maintained within reach of the defences, whereas the air attacking squadrons may start from a point some hundred or more miles away, and are only momentarily within the enemy's reach. Secondly, as regards surprise: here again aircraft have the advantage. The defence is most unlikely to discover the approaching carrier if the air attack is sea-borne, or the intention to attack if a start is made from a land aerodrome before dark. The number of planes required to maintain an effective reconnaissance at such a distance as will secure daylight notice of an attack during dark hours renders such routine patrols prohibitive. Night patrols for defensive purposes are out of the question; not only will they see nothing, but the sound of their engines will prevent the ground locating apparatus from giving notice of the approach of enemy formations. Extended listening posts round a harbour to seaward mean the maintenance of ships on a circle of some thirty-five miles from the port, if sufficient warning of an approach of bombing squadrons is to be given to enable fighter squadrons to gain the necessary height to counter attack. It is unlikely that such positions could be maintained. Consequently, the chances of complete surprise in a night bombing attack seem to be very considerable.

For an attack by heavy guns, the ships carrying them must approach at a speed which is very much slower than that of aircraft, and they must

remain in position for some time, and finally retire, again at a comparatively slow speed. They render themselves open to attack by submarines, aircraft, motor boats—either of the C.M.B., or electrically controlled type—and, moreover, will almost certainly be operating in mined waters. The enemy can maintain local patrols at such a distance from the port that the approach of ships to positions whence they can bombard—necessarily fairly close in—can be discovered in time to warn the defence.

As regards the volume of high explosive and accuracy of attack, it seems that by night the bomb again will score. Given efficient lighting of the target area by flares, bombers should be able quickly to drop a large quantity of high explosive. It is true that one gun can deliver many shell, while one aircraft cannot deliver many bombs, but where the target is not an armoured ship, the effective charge of the bomb is far higher than that of the shell; a considerable number of aircraft can moreover deliver a large number of bombs nearly simultaneously, whereas the number of ships required to deliver a similar quantity of high explosive in the form of shell in the same time would probably entail so much risk to valuable units that it could not be accepted. Moreover, if any reasonable accuracy with gunfire is required, aeroplanes are necessary for observation and correction of the fire. The foregoing remarks apply, however, to the attack of harbour works, rather than to that of heavy ships in harbour. When hitting an individual ship and penetration of armour enters into the question, it seems that the balance between shell and bomb is more even, and it must be left to time and experience to decide which is the better agent to destroy ships in harbour.

Aircraft cannot block a harbour, but, as at Zeebrugge, they may be of use as a diversion, or as an aid to the attack. In the latter respect, curtains of smoke can be laid accurately to blind the lights and guns of the defence, while illuminating flares can be dropped when and where they are required by the attacking force. Further, although the use of gas is prohibited in civilized war, it may so happen that once again an unscrupulous enemy may make use of it. As an adjunct to attack on a harbour, or even perhaps as the agent of a main attack, aircraft spraying some form of gas may prove a serious weapon. The use of gas in this type of attack is perhaps worth consideration. As an adjunct, its use seems to be rather dangerous. A shift of wind, such as occurred at Zeebrugge, would turn the tables on the attack, and with the confusion and rapid developments of a night attack on a harbour, the necessity to use gas masks might handicap the attack to such an extent as to prejudice the chances of success. On the other hand, the use of gas by the defence might be very effective, and in the future, an off shore wind may prove one of the greatest obstacles to an attack on a harbour.

In certain parts of the world, where land and sea breezes alternate with the darkness and daylight, this question must be seriously considered not only from the point of view of the possible use of gas, but also in its bearing on the use of smoke screens.

Developments of material have, since the late war, introduced a new weapon which may have some value in the type of operation under discussion. In 1918, the Germans on the Belgian Coast produced and used a distant controlled motor boat, of the C.M.B. type, whose bow was filled with high explosive; and since the war both Germany and ourselves have produced target ships which can be controlled entirely by wireless impulses from a vessel at a distance. At first sight, such a type of vessel seems eminently suitable for harbour attacks, either as a block ship, or in the case of smaller craft, to take the place of the C.M.B. But the direction of such a vessel can only be satisfactorily carried out by direct observation, and in a night attack, this will be rendered doubly difficult through the interference of smoke, searchlights, and star shell. The aeroplane again suggests itself as a solution, but, an observer in the air cannot always be aware of sudden emergencies arising at surface level. It may prove that the best method of using distant control is a combination of a normal crew on board the vessel and of distant control with air observation. A very close liaison between the officer on the bridge and the observer in the aeroplane would be essential, but it is possible that this combination might have better results than an attempt to use distant control alone, or to trust entirely to a crew on board the vessel.

For the small motor boat controlled from the air, it would be essential to illuminate the boat so that the controlling plane could see it. This does away with any chance of surprise, and rather puts the idea out of court.

The value of submarines in the attack of harbours has not been discussed, as their value depends entirely on the progress of anti-submarine defences. Their advantage lies in comparative invisibility; but their handiness in narrow water, their size, and the depth of water they require are limitations. Undoubtedly, against a harbour unprotected by anti-submarine devices their value would be very great, but it seems unreasonable to suppose that any ships of value would ever be risked in such a harbour. The amount of damage likely to be done by a submarine's gunfire is not great.

Control of sea communications is rendered difficult in direct proportion to the number and facilities of harbours and bases possessed by the enemy. If we can attack these harbours, be the agency ships or aircraft, we may be able early to achieve that victory at sea which took so long to secure in the last war, and by so doing save the expenditure of much treasure and the lives of many men of our sister Service.

MISSILE AND ASSAULT WEAPONS

By COLONEL F. S. THACKERAY, D.S.O., M.C.

THE proportion of missile to assault weapons, whether these have been the bow and the spear, the javelin and the sword or the musket and the pike, has been subject to variation from the earliest days down to the present time. The question is now how many bayonet-men are still required for the assault, since the introduction of so many automatic missile weapons is leading to a virtual elimination of our only assault weapon. Either form of weapon was and still is dependent on the other. The assault weapon requires the fire of the missile weapon to enable any advance to be made, just as the earlier missile weapons, the bow and the musket, owing to their shortness of range and slowness in loading, were dependent on the close co-operation of the spear or pike for protection against mounted attack. Similarly to-day the bayonet may often be called upon for the protection of machine guns at night, in foggy or misty weather, in smoke or close woody country.

The difficulty, when missile and assault weapons were carried by different bodies of men, has always been to distribute them so that :—

- (a) they should not be intermixed to the extent of interfering with each other. King John of France so mixed his crossbow men and men-at-arms at Poitiers as to interfere with each other ;
- (b) they should not be so separated as to interfere with proper co-operation. Wallace at Falkirk so separated his archers from his schiltroons that they were ridden down before help could come to them.

The Romans overcame the difficulty by arming each man with a missile and an assault weapon, the javelin and short stabbing sword. As the legionaries came within range, they hurled their javelins and rushed forward with their swords before their opponents could recover. For this purpose they were formed in "maniples," small independent bodies of men, who owing to the peculiarity of the formation were enabled to fight forward where they could, without consideration of those to their right or left.

The invention of the plug bayonet in 1670, followed by its conversion to the socket bayonet in 1682 inaugurated a great advance, since the concentration of the two characteristics in one weapon, fire and assault, made for the simplicity which is a key to victory. Until the introduction of the bayonet there had been a tendency throughout the XVIth century to reduce the number of pikes and to increase the number of muskets. Muskets had so much improved, and the rate of fire had been so much increased by the introduction of cartridges and new methods of drill, that the necessity for the protection of the musketeers was not so urgent. Moreover, in those days the assault was usually carried out by cavalry. The following extract from the Memoirs of Monro, who served with Mackay's Regiment under Gustavus Adolphus tends to show that the pike was occasionally used for assault, "Pikemen shall always be my choice when going on execution, as also in retiring honourably from an enemy."

In the South African War the Boers were not armed with a bayonet. The result of this was that they never made a charge and seldom waited for one to be delivered against them. Consequently the need for the bayonet was never apparent.

In the late war, our rifle fire in 1914 was sufficient to repel the very determined attacks of the highly trained German army. Subsequently, however, when the line became stabilized, with trenches at close range, the musketry of the drafts rapidly deteriorated while that of the New Army was never of a high order. In order to hold up surprise attacks the Lewis Gun was introduced and did valuable work in the hour of need.

As in the XVIth century, so now the increase in fire power has tended to a reduction in the infantry assault weapon. But whereas in the XVIth century the infantry assault weapon was not essential, since the cavalry usually carried out the assault, to-day the infantry must carry out the assault, except in those attacks where a large number of tanks are available. It is contended that as no objective can be won from a resolute enemy without assault, so it is essential that the bayonet should still be recognized as one of the chief weapons of infantry.

The introduction of two automatic sections into the platoon considerably reduced the available bayonets for assault. Should heavy casualties now be suffered, the bayonets of a platoon may become negligible. Further the mixing of light automatics with rifles and bayonets may be compared with the mingling of crossbowmen and men-at-arms at Poitiers; each ends by nullifying the full use of the other. The light automatic reduces mobility, an essential of a platoon; the bayonet men, if they seize every opportunity of getting forward will mask the fire of the light automatic. Moreover, so long as the infantry

missile weapon possesses such a range and is so effective, there is no need to have the power of assault and great volume of fire in the same body of men.

Now we have suffered a further reduction of bayonets by the formation of a machine gun company at the expense of a rifle company. It is contended that if these machine guns are used as infantry weapons, not as the French used their mitrailleuses in the Franco-Prussian War, and if they are used well forward, then sufficient volume of small arm fire can be obtained from them and the rifles of the bayonet men. Therefore it will be of vital importance that such opportunities for further advance as may be afforded by machine gun and shell fire should be exploited at once, and so junior commanders must be prepared to seize the initiative at any moment. Yet, unless they have their command in hand at all times, they will be unable to do so, since the reduction in their assaulting power, the incubus of limbers and the lack of homogeneity in their command will in 99 cases out of 100 preclude such a result.

Should we not, therefore, ask ourselves whether by the elimination of the light automatic the rifle companies would not have more ammunition with which to perfect themselves in musketry and more time to become adept in the use of the bayonet? This certainly appears to be a matter of great importance to Territorials, to whom simplicity in armament must always be a blessing.

To sum up our argument:—

In South Africa the openness of the country and the fact that our enemy was not armed for close quarter fighting failed to bring out the value of the bayonet.

The late war showed that well-trained troops, such as we had in 1914, had no need for an increase of their fire power in spite of the wonderful targets for automatic weapons that were afforded. Now we have eight times as many machine guns, and we have sacrificed a mobile company. We must compensate for this by making our rifle companies more mobile.

What is the reason for retaining light automatics? In defence their fire power is superfluous, in attack they are an encumbrance. Moreover, the reduction in bayonets can have no other effect than a corresponding reduction in the *elan* of assaulting troops.

THE TRAINING OF THE ARMY OFFICER

By CAPTAIN H. E. MADGE, 4th P.W.O. Gurkha Rifles.

SOME months ago Captain H. C. Westmorland, in discussing the qualities desirable in an officer,¹ stated that "the basic ingredients of a leader" are "an elastic mind and a knowledge of human nature." This is incontrovertible. Yet the author continues in a way which makes it appear that he is losing sight of one of those basic ingredients—namely the "knowledge of human nature." I will, therefore, repeat a sentence coming near the end of that paragraph of Training and Manœuvre Regulations, 1923, which the writer takes as his text, i.e., "above everything they, namely those who aspire to lead men, must possess sympathy with those under instruction." Secondly, I will attempt to place that human and personal element in its true relationship to Captain Westmorland's fertile suggestions.

Captain Westmorland then went on to state: "administrators can be taught, but leaders are surely born." Although the majority may hold the belief that great leaders are born, we hold that some capacity to lead is a trait without which few of the officer class enter the Army. Nevertheless, this quality is often lost, or at all events stunted or left undeveloped, during an officer's early years in the Service. Here, I think, Captain Westmorland loses sight of the second of his basic ingredients. The very first characteristic required in a leader is the capacity for getting into the hearts and minds of the men he is to lead, in other words, an aptitude for obtaining a "knowledge of human nature." The officer who has acquired a practical knowledge of human nature will win the hearts of his men and be their leader because they will follow him whether he is right or wrong. On the other hand, the officer who is tactically as efficient as can be, yet does not possess this knowledge of human nature, will never make a leader, because without this faculty he will not win the confidence of his men.

The writer goes on to state that "it is doubtful whether we can produce both leaders in war and trainers in peace in one and the same

¹ See "The Training of the Army Officer." By Captain H. C. Westmorland, D.S.O.; R.U.S.I. JOURNAL, August, 1930, p. 582.

person ; a leader and a tactical director, i.e. trainer, are more often than not separate individuals." This is a statement which I hold is not altogether true. If an officer has the second basic ingredient of leadership, i.e. knowledge of human nature, I maintain that he will, in the majority of cases, also have an elastic mind. Every man in a platoon or company is different. If, therefore, an officer can understand all his men, and treat each so as to get the best out of him, he must have a mind which is elastic. Given then that the officer possesses the two basic ingredients of leadership, he can usually, with training, become a tactical director or trainer, for surely knowledge of human nature is equally as essential in the trainer as in the leader. An officer may have exceptional tactical ability in the form of being able to think clearly, and act reasonably under a series of circumstances, but if he does not possess the knowledge of human nature necessary to enable him to understand the minds and the difficulties of those whom he is to train, he will not be able to impart his tactical knowledge to others.

II.

I would like to add to Captain Westmorland's remarks in the first paragraph of his third section, that the time devoted to tactical training in the afternoon would not only impair the officer's physical fitness, it would also curtail the time, already far too short, in which he can obtain that human touch with his men, which, to my mind, is of equal importance. The writer states, "there is far too much tendency to treat the modern officer as a magnified non-commissioned officer and expect him to learn a mass of wholly unnecessary detail about the working of machine-guns and light automatics. . . ." Are these details so wholly unnecessary ? In order to be able to teach any portion of a subject thoroughly, it is admitted that the instructor must possess a complete knowledge of the whole of his subject. Moreover, lack of knowledge of technical details very often leads to erroneous tactical ideas. I therefore think that it is most essential that young officers should be trained in the technical details of mechanical weapons, before they go on to study the tactical employment of such weapons. Here, once again, the human element comes in, since the words of an officer who is recognized as a technical expert in a weapon, as well as a master of its tactical use, will carry far more weight with those he is training than will the words of one who does not fully understand the technical difficulties of the man behind the weapon.

With the final paragraph of the writer's third section hardly any regimental officer could be found to disagree. Herein surely lies the pith of the whole problem of finding time for training. At the present

time, perhaps, especially in India, and certainly in the Indian Army,¹ an officer wastes in the office many valuable hours which might be spent in training others or in studying by himself. The training of his subordinates, which an officer has to supervise and carry out, and the study of his profession to which he must devote himself in his spare time, are far greater in these days of many weapons, of continual experiment and development than they were previous to the Great War. Yet the office work which has to be done by officers is also far greater than in pre-war days. To relieve the officer of all the office work, which has increased so much, should be the very first step to be taken to improve his tactical training by giving him time for such study. Under present circumstances he cannot obtain this time, except at the cost of his physical fitness and of opportunities for strengthening that personal touch between himself and his men, which is essential to leadership.

III.

In view of the foregoing remarks I would suggest the following amendment, in the first place, to the suggestion given by Captain Westmorland in sub-paragraph (2) of his final section. More time for the training of officers during normal working hours should not be found by allowing all training, as far as the training of the company is concerned, to be carried out by warrant and non-commissioned officers, for this would deprive the officer of some of his opportunities for the study of his men. Rather this time should be found by relieving officers from the abnormal amount of office work which they have to carry out and supervise at present, and which has no relationship to the primary object of the corps of officers "to produce leaders and commanders in war and trainers in peace."

Secondly, I would strongly endorse the proposal in sub-paragraph (4) that lecturing and the conduct of tactical exercise without troops should form part of the syllabus of the examination for promotion from captain to major. Indeed, I would also add that lecturing should also be included in the examination for promotion of lieutenants to captain. To be able to lecture is certainly a very necessary qualification for the trainer, and it is something which can be taught. At least it can be taught to the extent that the lecturer will be able to keep the attention of his audience and send them away with some point learnt from his lecture, whereas an untaught lecturer, unless he possesses this natural gift, will merely bore his audience.

¹ This is far less the case in the British Service.—EDITOR.

In conclusion, at the risk of repetition, I wish to stress the essential quality of "knowledge of human nature" in the leader and the fact that this can be acquired by study, just as tactical efficiency also can be improved by study. Knowledge of human nature, however, is not obtainable by study of books, manuals or tactical exercises, but by personal study of the men whom an officer commands. In our anxiety to attain the second object of the corps of officers, the faculty of training, do not let us forget that we also require leaders, and that though leaders may be born in one sense, yet even the born leader will never rise to any great eminence without study or without developing his qualities as a leader. This study and this development are of equal importance to the study of tactics and the development of tactical efficiency.

In these days of mechanics we are for ever discussing the effect of mechanical weapons and mechanized forces, until it seems to me that we, junior officers, are not made to realize sufficiently the importance of the human touch in leadership. Insufficient incentive is given to young officers to get into personal relationship with their men, although in certain units this is certainly the practice. The visible results attained in the discipline and training of such units are an adequate proof of the influence thus exercised by officers. When it comes to the real test of war, it is the personal hold which an officer has over his men, and the esteem in which they hold him, because he understands as well as commands, that creates the mutual confidence which should be the very essence of military discipline.

COAL OR OIL AS FUEL FOR THE NAVY

(In view of the arguments in favour of a return to coal in the Navy which have lately appeared in certain quarters, the following summary of the reply made by Mr. C. G. Ammon, representing the Board of Admiralty, to a deputation described as representing the interests and welfare of South Wales and Monmouthshire, is of importance.—EDITOR.)

THE question whether H.M. ships should be designed to burn coal or oil has been under continuous consideration by the Board of Admiralty since oil-fired boilers first became a practicable proposition. Oil burning was not adopted in the first place without thorough trial, and its use has not been extended without fully weighing all the advantages and disadvantages. Experience in the war showed most definitely the advantages of oil fuel.

The question may be considered under the following heads :—

- (1) Operational.
- (2) Technical.
- (3) Manning.
- (4) Supply.

Operational.—Ships burning oil fuel can steam continuously at maximum power until practically all fuel on board is expended, and without any increased effort on the part of the personnel. Speed can be increased or decreased at short notice without difficulty, and in much less time than must be taken with coal-fired boilers. Coal-burning ships cannot steam full speed for more than a limited time without having to clean fires, while the work of maintaining an adequate supply of coal to the boilers becomes increasingly arduous and difficult.

Whereas oil can be pumped from any part of the ship without difficulty, coal has to be man-handled from the bunkers, and only those bunkers which are adjacent to the stoke-holds are readily accessible. As coal is expended, much greater labour is involved in preparing and arranging for its supply in sufficient quantity to the stoke-holds. Owing to the necessity for maintaining the watertight subdivision of the ship, the problem of supplying an adequate quantity of coal to the boilers during action has become a matter of grave difficulty, depending upon the quantity used previously and the duration of action conditions.

The endurance of a warship is of the highest operational importance, and experience shows that on any given weight of fuel the endurance of an oil-burning ship is nearly double that of a coal burner.

Oil-burning warships can be re-fuelled much more rapidly and easily than coal burners. The rate of fuelling with oil is two-and-a-half to three times that of coal, and with practically no effort on the part of the personnel, whilst ships can embark ammunition and stores at the same time.

At sea, oil-burning ships can be steamed with a minimum of smoke, while at the same time the making of smoke is under control for tactical purposes. Absence of smoke is of high tactical and gunnery importance, and in this respect coal-burning ships are at a definite disadvantage.

Technical.—Oil has a calorific value 1.3 to 1.4 times that of coal.

The space required for the stowage of one ton of Welsh steam coal varies from 40 to 43 cu. ft., whereas one ton of oil averages about 38 cu. ft. Moreover, oil bunkers can be filled almost completely, whereas in coal bunkers there is an appreciable loss from broken stowage.

Oil can be stowed in any compartment, large or small, in any position in the ship, and the fullest use can be made of every available space throughout her hold without impairing supply to the boilers.

In coal-burning ships, as already stated, the only readily accessible stowage is abreast the boiler-rooms, and in ships requiring large endurance, a large proportion of the coal must be stowed in bunkers which are not easily accessible or which cannot be worked without increasing the labour necessary to keep up and maintain supply. In the war, for example, many ships carried large quantities of coal in reserve bunkers which it was found impossible to use, and for operational purposes this coal might just as well not have been on board.

Although this coal may have added somewhat to protection, the space and weight thus used up could have been made much better use of in other ways.

In a coal-burning ship a number of watertight doors must be fitted in the principal bulkheads to enable the coal to be brought to the stokeholds. Scuttles are also necessary in the protective and other decks for trimming and shipping purposes. Many of the doors, especially those opening on to the stokeholds, and thus below water, have to remain open when the ship is steaming.

With oil fuel these doors and scuttles are not required, and the watertight subdivision is, therefore, more efficient, the protection is thereby improved, and the strength of the structure increased. Moreover, the

bulkheads, decks, etc., forming the boundaries of the fuel tanks remain fully efficient, being always under test, a condition which cannot be assured with the boundaries of coal bunkers. In the latest warships, in which the weight of fuel carried is about 30 per cent. of the displacement, this advantage is most valuable.

With the limitations of weight and space incumbent upon all naval designs, the rate of forcing of the boilers is necessarily high. With coal-fired boilers the consumption of coal per square foot of grate area must be large, in order to keep the boiler dimensions and weights within reasonable limits. At these high rates the consumption of coal is necessarily inefficient. Artificially forced draught must be resorted to, and relatively large quantities of unburned, or only partially consumed, fuel are carried away with the funnel gases. The boiler heating surfaces become foul, and the gas spaces between the tubes choked with soot, ash, etc., with the result that heat transmission is impaired, efficiency is still further reduced, and the already dirty fires are required to burn even more coal than before, if the output of steam is to be maintained.

With fuel oil, on the other hand, the combustion of the fuel is under perfect control, and, with the latest improvements in oil-burning arrangements, practically complete combustion of the fuel in the furnace can be assured. In consequence, the efficiency of heat transmission is not impaired to any appreciable extent, even after prolonged steaming at high powers.

With coal fires, the human element limits the size of fire grate to about 7 ft. 6 in. in length. The length of oil-fired boilers is not so limited, and oil-fired boilers 21 ft. in length are now being employed. For high-powered ships, therefore, the use of coal necessitates a large number of small boilers, whereas with oil the same output can be obtained from a small number of large units, resulting in a considerable saving in weight and space, and more favourable watertight subdivision of the hull.

Owing to the ease with which it can be transferred from one compartment of the ship to another, oil fuel can be used readily for purposes of correcting the heel and trim of the ship in case of damage or it can be pumped overboard, if it is necessary to reduce draught. This facility may be of great importance. Coal and coal bunkers cannot be similarly made use of.

It can be stated definitely that on a given displacement, whilst retaining other military qualities, it would be impossible to design a coal-burning ship of the same speed and endurance as an oil burner. If speed alone be considered, the displacement would be not less than 20 per cent. to 25 per cent. greater in the case of the coal burner, but even in this larger ship the endurance would still be much less.

In effect, this means that if our ships were to burn coal while those of foreign Powers continue to use oil, our displacement would have to be consistently higher, which, on a limited tonnage figure (based on naval agreements with foreign Powers) in each category, would be an overwhelming disadvantage.

With regard to the possible conversion of existing ships from oil to coal, it may be said that this is impracticable without the most extensive and expensive alterations which would also have the effect of prejudicing design and greatly reducing speed and endurance, and that it would be impossible to make the change in existing vessels of the destroyer or cruiser type.

The "Royal Sovereign" class, which has been mentioned in this connection, was originally designed for coal, but this was changed at an early period in their construction, and it would not now be possible to revert to coal burning without alterations which would be nearly as great as those in a ship wholly designed for oil fuel.

Manning.—The engineering complement of a ship is decided by the number of men required to steam the ship continuously at high power working in three watches. The engine-room complement of a coal-fired ship averages twice that of an oil-fired vessel of equal power. In a ship of the battle cruiser class, this would mean an increase of complement of about 300 men; in an 8-in. cruiser of about 120.

Accommodation, provisions, drinking water, etc., would have to be provided for this increased complement, absorbing weight and space which could otherwise be devoted to other items of military importance.

Could the Navy as it exists to-day be converted to coal burning, it would require an addition of 15,000 engine-room ratings.

Supply.—Although the dependence of the Navy on foreign supplies of fuel is recognised to be a serious disability, and the Admiralty would much prefer to be able to use fuel of home production, the military advantages of using oil are considered greatly to outweigh the disadvantages. We are not dependent upon the supplies from any one country or from any one part of the world, whilst reserves of oil fuel can be and are being built up in various places.

With the exception of the United States and Russia, other naval powers are also dependent for their naval fuel upon the supply of foreign produced oil.

Conclusion.—Were the Navy to revert to coal as fuel, we should be accepting a handicap in design which would be a most serious set-back and could not now be undertaken without grave prejudice to the strength of the fleet and its operational efficiency.

THE INTERNATIONAL SITUATION

DISARMAMENT

I. SOME BRITISH VIEWS

FIELD-MARSHAL SIR WILLIAM ROBERTSON presided at a great meeting held at the Albert Hall on 11th July in support of the aims of the Disarmament Conference, which is to take place in Geneva next February. The chief speakers were the Prime Minister (Mr. Ramsay MacDonald), Mr. Baldwin and Mr. Lloyd George.

The Chairman said he hoped that the Disarmament Conference would succeed, but they knew that several nations were going to the Conference not prepared to accept limitations even at the present high levels, still less to agree to a reduction. Their military budgets continued to increase rather than to diminish, and we alone among the Great Powers had so far taken a genuine and definite step in that direction. Many people wished us to believe that disarmament was neither desirable nor feasible. He preferred to believe that the majority of people in the world in these days thought that war hurt everybody, benefited nobody—except the profiteers—and settled nothing.

MR. RAMSAY MACDONALD

Mr. MacDonald said this nation's honour was deeply pledged to disarmament. As a nation we signed Article VIII of the Covenant of the League of Nations; we signed the Preamble to Part V of the Treaty of Versailles; we also signed everything, all the expressions of opinions and intentions, that were embodied in the Treaty of Locarno. He was also under the impression that when the Treaty of Versailles was signed, when we were face to face with the Germans who had come there to meet us and sign that treaty, the Chairman of the Allies during the negotiations gave in writing a document, which ought to be pasted on every hoarding in this country, and which ought to be emblazoned in front of every delegate at the Conference next February in Geneva, saying that the Allies were not imposing this measure of disarmament upon Germany simply because Europe was afraid of German military ambitions—no, not that only, but this document . . . also said: "We are imposing this disarmament upon Germany as a first step towards the reduction and limitation of armaments which we seek to bring about, as one of

the most fruitful preventives of war, and which it will be one of the first duties of the League of Nations to promote."

It was very curious that, after all these things had been said and done, there was more money spent on armaments now than had been spent during any past period of peace. The sentiment of peace was universal, but the practice of peace was circumscribed. There was not a single delegate who would go to Geneva in February who would not preach peace, not one who would say that the sentiment of peace was wrong. There was not one who would not utter those opinions with the utmost eloquence and conviction, but as soon as they began to work in their sub-committees the difficulties of securing international disarmament would appear. Sentiment and piety were not enough now . . . and the world expected from Geneva not merely resolutions saying that they were all in favour of peace, but a reduction in figures, in tonnages, in man power, in material, an actual reduction in those materials which meant that the nations were preparing for war.

"We are going to Geneva," Mr. MacDonald concluded, "determined by persuasion, by arguments, by appeals, to what has been written, appeals to measures already taken, appeals to history, appeals to common sense, to get the nations of the world to join in and reduce this enormous, disgraceful burden of armaments which we are now bearing from one end of the world to the other."

MR. BALDWIN

Mr. Baldwin said he was in complete agreement with what the Prime Minister said on the subject of our obligations. We were bound by treaty and by honour to international disarmament. In the House of Commons a few days ago Mr. Shaw, the Secretary for War, gave figures which showed that in the last six years we alone in the world, except to a fractional extent the Japanese, had reduced military expenditure against the figures of many foreign nations, which had been raised in some cases inordinately, in the last five years. And with regard to navies, the Prime Minister gave certain figures, and added these pregnant words: "An examination of the figures of the *personnel* of other countries will show that they have increased in much the same proportion as ours have decreased."

Nowhere was the will to peace, which we had in this country in no light measure, more strikingly demonstrated than in the field of air disarmament.

Such a situation could not continue indefinitely, and there was nothing more urgently wanted at this Conference than to press for reductions in the air forces of the world, an attempt to bring about

some form of parity in the air forces of Western Europe, as he regarded the air force as the spearhead of invasion, and probably the most dangerous form of arm against peace which existed in the world to-day. Our own Air Estimates this year were slightly lower than they were six years ago, while in other foreign countries they went up, in one case as high as 150 per cent. increase on the figures of six years ago. We had sunk to the fifth place in air armaments in the world. British air expenditure to-day represented $2\frac{1}{2}$ per cent. of our Budget. The corresponding figure in the case of France was roughly 5, and in the United States of America and Italy roughly 4 . . .

That had been a one-sided disarmament. Our hope in Europe was in the League of Nations. . . . The League of Nations suffered from the absence of two nations, one in the East and one in the West, who were necessary to it before it could accomplish the work that it ought to accomplish. He meant Russia and the United States of America. He rejoiced to think that both those nations would be represented at the Disarmament Conference. The negotiations with Russia must necessarily be difficult from the nature of the case itself; but until they could see in that country progressive disarmament, they could never get rid of the fear that existed in Eastern Europe against so great and so powerful a neighbour. And, while it was not for us either to ask, or to advise, or to try to cajole the United States of America to get them to come into the League of Nations, yet he did say this without fear of contradiction from any statesman who had had to deal with international problems in Europe; that every international problem in Europe since the Treaty of Versailles had been made incomparably more difficult to Europeans by the absence of America from the League of Nations.

Article XVI of the Covenant was drawn up in the full belief that America would be a member of the League of Nations. Did anyone know what the action of the United States of America would be in the event of a blockade in Europe? No one. It was our ignorance on that question, our fear of what blockade would mean with America not a member of the League of Nations, that cast doubt and threw difficulty in relation to one of the most important articles in the Covenant of the League. There was a host of reasons why we wanted America to be a member of the League of Nations, and there was this reason in particular: we wanted her help in these appalling problems of reconciling national interests and disarmament.

MR. LLOYD GEORGE

Mr. Lloyd George said that one of the dangers of the position was that disarmament was one of those questions where everybody agreed in principle and differed in practice . . .

To get results on any question they must first of all face realities. Take the Covenant of the League of Nations. Lord Cecil and he had the honour of collaborating in carrying that through. By that Covenant, as the Prime Minister had pointed out, there was an undertaking on the part of all the signatories to that treaty to reduce armaments to the lowest minimum compatible with security. Security had been made greater by the establishment of the League of Nations. Every nation—and there were over thirty there, great and small—signed it, and signed it with alacrity. Did they mean it? Perhaps they did; perhaps they did not. All he knew was it had not been done. Had they tried? To a very considerable extent we had carried out our undertakings. We abolished conscription right away. We reduced our land forces and, as one of the greatest maritime Powers in the world, both at the Washington Conference and at the London Conference we did our best to reduce naval armaments.

That had been a good beginning. But take the land forces and the air forces of the world. Some of the Powers, after signing that Covenant and after authorizing M. Clemenceau to make that famous declaration—it was not his; he did it at the request of the Allied and Associated Powers, and gave that solemn pledge—some of the Powers, as soon as they got home, forthwith started to build up new armies, great armies. They taxed themselves and borrowed from others to equip those armies, and almost all nations had been engaged ever since in increasing and perfecting and strengthening their armaments. They had kept Germany to her promise, but they had broken their own.

Then we had a Disarmament Commission. It had been sitting for years—and so far had hatched nothing. Then they had Locarno, with peace and security and arbitration, which was to be followed by disarmament, and the joy bells were ringing, and there were banquets at Locarno and Paris and London to celebrate the new era. The Angel of Peace had never been so toasted before. But since then preparations for war had been going on in almost every country throughout the world which signed that treaty, and at an accelerated pace, so that somebody said, "You must have another idea. You must have a Pact to renounce war altogether." That was proposed by a country whose armaments were much more powerful than they were before the War; and those armaments had increased since they signed the Pact to renounce war. Sixty other countries signed. They had, all of them, great armies, and since they signed the Pact to renounce war armies had become greater and more powerful.

There was a banquet given by a country with the greatest army in the world—the greatest army the world had ever seen—and since it

signed the Pact and celebrated it, it had added enormously to the power of its armaments. They all renounced war, but they forgot to renounce the preparations for war.

In this country our taxation was the heaviest in the world. One reason was because we paid our debts. The nations of the world were now spending over £800,000,000 when they were tottering on the brink of bankruptcy, to prepare for war. Let them be quite frank. The only lessons of the War to which practical effect was given to-day were the military lessons. Military defects had been studied, and steps taken to remedy them for the next war. In the last War they had horrible carnage. The next was inconceivable; and yet the world was going on steadily, stolidly, stupidly, marching towards that catastrophe, singing the songs of peace and preparing for war. At this moment everybody who had returned from the Continent of Europe told him that it was one of the commonplaces of conversation there, "Next war"—those two words. "Who will be on our side?"—and the real lessons of war not yet learned. They would never get real disarmament until they renounced war, not merely on a scroll of paper but in the hearts of men.

A resolution was carried unanimously urging the Government "to do all in its power to bring about a real reduction in the armies, navies and air forces of the world."

II. AN AMERICAN VIEW

(A summary of a lecture on "Naval Strength and its bearing on International Relations," delivered by Admiral W. V. Pratt, U.S. Navy, Chief of Naval Operations, before the Institute of International Problems of the United States, at Boston, Massachusetts. Published by courtesy of Admiral Pratt.)

HOWEVER much we may desire to see the day when world peace has become an accomplished fact, in the present condition of the World a long period must elapse before that can come to pass.

The problem of international relationship on which the possibility of world peace depends will be better understood by analysing the grouping of the world's nations according to their fundamental characteristics. If this be done, we find that nations fall into the following classifications:—

- (1) Nations having the same social, traditional, racial and religious background as ourselves, speaking a common language, deriving their laws from the same source, and whose immediate aims in life are similar to our own;

- (2) Nations similar to those in the above group but differing from it as regards race and common tongue ;
- (3) Nations with hardly any of the foregoing characteristics, but whose aims for the future are similar ;
- (4) Nations with none of the characteristics mentioned in the above ;
- (5) Nations that believe in and maintain strong stable governments and others that do not. This classification cuts across that previously adopted ;
- (6) Nations which resort to revolution in place of orderly processes of law or arbitration in order to change their form of government ;
- (7) Nations in which the seeds of revolution and anarchy reside, that believe in war and revolution or any means, fair or foul, for spreading abroad their own conception of government ;
- (8) The submerged nations which have as yet no articulate expression in the great world of affairs.

As things exist to-day it is possible only among groups (1), (2), (3) and to some extent (5) to come to some definite understanding regarding world peace which can have much prospect of being of an enduring character.

ECONOMIC AND MILITARY FACTORS

Let us next consider the broad paths along which such understandings will run. These, in general terms, appear to be (a) economic ; (b) social ; (c) military. The first and last are the more important ; world betterment, pure and simple, falls into category (b). The economic factor comes first in peace, but only second in war. Again, in peace we see the economic and military factors pursuing separate and not necessarily similar paths. Even this condition must vary. In a government organized under a more centralized and autocratic control the economic and military factors can be made to work hand in hand, just as they must, and will, work in time of war. In peace, however, such a combination may lead to a state of affairs bordering on, if not entirely, aggressive in operation. But in a country like the United States it is not probable that the combination of these factors would produce an aggressive frame of mind deliberately followed by aggressive acts conducive to war. Still it is possible for either economic or military factors, from the way in which they are handled, to become either deliberately or unintentionally aggressive in fact. This circumstance has led to conferences by which armaments have been partially limited. This result in turn has led to a widespread belief that by curbing military

forces alone it is possible to reach some solution of the problem of world peace. Unfortunately, this is far from the truth. Nevertheless such circumstances, taken in conjunction with a recollection of the horrors of war, have given rise to the existence of pacifist groups and associations which are unable to see that the aggressive spirit, normally linked with military matters, is one of the commonest things in life and influences almost all of its activities. It is not abolition and intolerance but temperance and tolerance in all things that the world needs. This is but another way of applying the spirit underlying limitation of armaments to all matters relating to international contacts as well as to certain internal problems. It is true, of course, to hold that unchecked military aspiration may lead a nation to dare anything, so long as it is not restrained by a moral distinction of right and wrong, because it feels the possession of the power of achieving its end. Competitive armament, moreover, can produce a mental condition in a nation which may lead to actual hostilities. The limitation of armaments is therefore wise ; but it is a totally different thing from disarmament, while its ideals are not the same.

Taking the economic factor into consideration, the conviction rapidly grows that the dangers which it offers to world peace have neither been properly appreciated nor adequately studied. It is more subtle ; less easy to define. Military matters affect the nation first, the individual second. Economic conditions affect the individual directly, or at any rate those organizations with which the individual does business. The result is a certain lack of reciprocity in the matter of the economic factor, so that a nation which desires to improve its position in the world is, under present conditions, led to do so at the expense of some other national group. If reciprocity comes into perspective at all, it is not by intention, but because it has been forced upon a nation. Consequently it seems imperative, if we wish to attain a state of world peace, that we should recognize the power of the economic factor and how easily it may be turned to upset a stable condition, even when on the military side we have come to mutual agreements and limitations. Too little thought is given to the economic conditions under which other national and racial groups live, with the result that it is the military problem, rather than the economic factor, and its bearing on peace or war, around which discussion centres. If we intend to pursue the same course as that which other nations have followed in the past, we may have to adopt, with modifications, methods which in the end will need defending by force.

The conception of modern war, intensified by the teaching of the Great War, is that the whole nation with its entire resources is thrown

into organized warfare. With the scientific and industrial advance of the age this condition must continue unless the clearest thinking and the strongest effort on the part of our leaders be capable of preventing it.

With the unlimited war of to-day the price of victory may be so great that an earlier defeat or surrender might be preferable. Victory is frequently no longer worth the price. How far will the world realize this? In the heat of passion the only thing that matters is to make the other pay most. Consequently we may conclude that the peacetime limitation of armies and navies cannot be regarded as giving absolute security for world peace. War may still come through causes other than military, with the difference that it may find the military factor in a depleted condition. It is now held that arbitration, courts of appeal, and just laws and decisions must replace wars of aggression, while military forces must be reduced to such as are fit for wars of defence alone; but similar methods must be applied to all other factors in national life, the undisciplined or unreasonable use of which might in the end result in war.

The armament problem seems to be on the road to a solution, but the economic problem is still in its infancy. The armament question only becomes a personal matter when danger is imminent, but economic problems touch every day life, and in this the individual is prone to be more conservative and less open to receptivity and reciprocity; yet these are the important problems to consider if we want to get at the causes of war, and are not willing to rest content with a partial solution, which is all that a limitation of armaments provides.

LIMITATION OF ARMAMENTS

In recent years the idea of limitation of armaments has taken so strong a hold on the imagination of some people that they conceive the solution of that problem will practically solve the problem of war, but that is not the case. By limiting armaments we may postpone a war and remove some of the causes of war, but in the end if people feel deeply aggrieved and decide to fight they will fight whether their armaments be limited or not. Reduction of competition in armaments may largely eliminate the element of fear, and that in itself is a potent factor in prolonging peace. But when we have done all these things we have not reached the solution of our problems.

Even along the road to limitation progress has not gone far. Naval armament has contributed most to the cause; but so far there has been little real agreement, and too much haggling over details. Military armament has, as yet, made few if any sacrifices, and the state which exists among certain naval Powers, that just agreement is essential in

the interests of world peace, has not been arrived at among the great military Powers.

Then what about air power? Air power believes openly, and says so, that the proper method to bring a nation to its knees is by bombing, not only the military forces, but everything, whether in the front line trenches or behind the trenches; in other words it contemplates complete annihilation of the enemy. It is obvious that the idea and scheme of limitation must be applied to the air as to other military forces. I would wish to see certain mutual undertakings or agreements among nations as to how military and air forces not already limited will be used in war—otherwise we run the risk of seeing civilization near to being annihilated in a future war.

But the moment we accept this idea of limitation of military effort, we change our standards. In military matters what was aggressive becomes defensive. Armaments are now not built for aggressive purposes. With limitation a new importance is given to agreement. The moment we think in terms of agreement, arbitration and courts of appeal and the like assume another importance.

DISARMAMENT

While on this subject, I would like to reiterate that "Disarmament" and "Limitation of armament" do not mean the same thing. Complete disarmament means to throw down every guard, leaving a nation at the mercy of every other Power, great or small. It may be a very pious wish, but until the world is a better world than we know to-day, it is an unwise and unsafe course to pursue. Not only may you work your own self-destruction, but you may leave a heritage of weakness to your children which you have no right to leave. "Limitation," on the other hand, implies scaling down armaments not beyond a standard which is safe for national existence. It is a process which is in keeping with the trend of the times; if not carried to undue lengths, it tends to efficiency, makes for economy and permits of standardization. It tends to eliminate suspicion.

Now, what is parity in the scheme of limitation, and what are naval ratios in types of ships? Parity of naval tonnage in a limited sense speaks for itself in terms of figures yet means far more; it means an obligation to be just in all things, to be absolutely fair with that neighbour with whom we agree to maintain parity; it is also "an obligation upon us to take our share in the solution of those problems which hitherto have been the lot of the greater sea Power." As for ratios, there is no inherent value of given right, generally speaking, in any particular ratio. What may be appropriate or expedient during one term of years with any particular national group, may not fit later or be what might have

been demanded formerly. Every independent nation has a right to build as it sees fit, but when it accepts the principle of limitation, it will be wise to build only according to its means and needs. Regarded thus, and having eliminated fear and mistrust, it then becomes a much easier matter to agree upon ratios than it was in an era of unlimited building to impose restrictions by force or through the power of money.

NAVAL PARITY WITH BRITAIN

We must visualize parity with Great Britain as a different thing from the equality in fleet strength such as Germany aimed at before the War. In those days sea strength was used in three ways:—Firstly, for national defence; secondly, as an adjunct and instrument of aggression in diplomacy; and thirdly, as a powerful engine of war. The first is the most important; but in 1914 it was subordinated by Germany to the other two. The Kellogg Pact has now ruled out the aggressive use of sea strength, at any rate in the case of those great sea Powers who entered into the London Agreement. Limitation of naval armaments gives parity an entirely different meaning. England has been willing to come to an agreement with the United States in the matter of equality of fleet strengths, especially as it was not worth fighting for it under the old standards, nor had she the power to do so in face of our growing strength without too greatly depleting the resources of Europe. But stronger than this I feel there was no desire on her part ever to fight us over these matters. The result of the acceptance of parity seems to be that England must maintain a great sea fleet, second to none, and first as regards all other nations except the United States. This is necessary because she needs that strength, firstly, to defend her shores, secondly, to maintain free access to the sources of supply in the Dominions and Colonies. In the past the possession of the first sea fleet gave her the balance of power on the Continent, and, until the States came on the scene, of the entire world. At any moment England may be drawn into a Continental war; but the States would not be drawn into it unless it became a world war. Hence the different significance of parity. To the States it is much a matter of sentiment, as it was in 1776; but there is a new meaning in parity. With parity in our hands we hold the balance of power in any war that threatens to become a world war; as we decide, so the war will be apt to go. We cannot stop a war, but we can limit its duration and extent. We might even, before a war broke out, throw our influence this way or that to prevent its taking place.

Parity, by placing a great responsibility on the States must lead to a change of ideas about many things now regarded as fixed and stable. It may change American ideas as to neutrality. In the event of a world

war, could we be responsible for the destruction of modern civilization in order to maintain the preservation of our neutrality? With parity at sea we become a first-class world Power enjoying all its advantages and obligations. These must be understood if we are to act quickly and intelligently in an emergency without being biased by semi-obsolete formulæ. The power of parity gives the power of choice; the power of choice involves the responsibility of choosing wisely and correctly. A sea fleet second to none may give the power to avoid war altogether; its absence may entail unwilling participation in such a war. The task is one of difficulty, and involves political wisdom that will avoid following expediency when this runs counter to the standard of accepted right. We may have to court war in order to avoid war. Of course, we may refuse to accept our responsibilities, but is this a dignified course for a great world Power to take? American expansion would have forced us into our present position without parity; but parity gives us the power of choice.

SEA POWER AND THE UNITED STATES

Naval strength must be considered from two separate aspects: peace and war. In the matter of war, we are fortunately situated, in that it should be possible through wise statesmanship for us to avoid being one of the original combatants. We have reasonable assurance of a long period of peace, so far as our relations with other nations are concerned, but there is the possibility of our being drawn into a war not of our own making. The experience of the recent war indicates very clearly that had we not been a naval Power of some magnitude we might have become involved in the war earlier or forced into a course of action at variance with our doctrine of neutrality. Sufficient strength to preserve our neutrality, if that is what we wish, is therefore essential; but there is the further, and possibly even more important, point that we may be called on to decide on the merits of a case and to throw our weight on the side which we consider to be in the right. These aspects of the matter should come before the rigid doctrinaire view of preserving American neutrality at all costs and regardless of the merits of the dispute. In either case we require adequate naval strength, both for maintaining the dignity of a great nation and for carrying out our policy in the event of our being drawn into war. In the latter case, if we are sufficiently powerful we may be able to limit the war instead of waging unlimited war.

In peace, our navy is a matter of national insurance. It is an asset of diplomacy, since, as the world is to-day, the voice of the powerful state will be heard where that of the weak remains inaudible. During peace the size of the American navy should not be greater than that

necessary to carry on efficient training and to provide a nucleus about which the strength of the country can muster in a time of emergency. . . . The country loses nothing from the training which our military services give the young men recruited to form the rank and file. . . . "No better schools exist in our country, for the training of good citizenship, than the school of the two military services. The life of service and discipline led by our young sailors turns them out better Americans than some of the products of our colleges."

The London Treaty limits the American Navy until 1936. Meanwhile the question is, "shall we build to the terms of the Treaty or not?" Many Americans regard its requirements as optional and not obligatory, but other nations think differently, regarding it as obligatory. American action in the matter must re-act abroad; and if we regard the clauses of the Treaty as optional, and do not build up to them, then when we come to another conference we may find we have earned a reputation for asking much but doing little. For ten years we failed to live up to the spirit of the Washington agreement and to appropriate adequate sums for the construction of our Navy, with the result that it is now going to cost money to build and maintain a Treaty navy. It is a matter for the people to decide, and they must take full responsibility for their decision and not in time of need shift that responsibility to the military men who must carry the burden if war comes.

THE ABIDING DANGER TO WORLD PEACE

So far no allusion has been made to groups (6) and (7) which were mentioned in my original classification of nations. To begin with, I can see no hope of lasting peace so long as these two groups exist side by side with those already discussed. With the latter, under favourable conditions, there is a reasonable hope of peace, but with these two groups none. Still there is a great difference between group (6) and group (7). The former deserves much sympathy and tolerance for they may only be going through processes of change which now stable governments have gone through in the past. The firm helping hand is better fitted for dealing with the case than more arbitrary methods which might drive them into group (7). With the latter group no sympathy or close relations can exist. The world in which they live and that in which we live cannot exist side by side indefinitely without great compromise on the one side or the other. They openly proclaim that they will resort to war or any means to attain their ends, and that being so, some day it may fall to our lot to meet the challenge. To my mind death is preferable to the sacrifice of all the ideals which we hold dear and which we have fought to maintain through the ages.

III. A GERMAN VIEW

(Being extracts from an article by Captain Gadow, German Navy, in "Wissen und Wehr.")

THE after effects of the Thirty Years War, the War of the Spanish Succession and the Napoleonic era were not so dissimilar to those which follow on the Great War. The only novel feature in the modern world is the prevalence among the victorious nations of the belief that the possibility or necessity of war as a sociological phenomenon can be refuted and must be combated by every means.

Military thinkers all the world over have been too prone to dismiss this conception as being fundamentally unnatural. Yet the calibre of the men who have championed such theories, to mention only such names as those of Grotius or Kant, and the status of the Powers, who now hold similar views, provide grounds for careful investigation of such doctrines.

It is obvious that theories which strike at the root of accepted international relations will assume widely different forms when translated into terms of practical politics. If we approach the problem from this aspect, and apply certain tests to the aspirations and beliefs of modern nations, we shall obtain some interesting results.

The tests we would apply are these :—

- (i) How far and in what form do these nations consider that the Great Peace can materialize ?
- (ii) What value do they attach to such a Peace ?

Now, in Europe to-day there no longer exists, except in the narrowest circle of literary pacifism, any unconditional negation of the possibility of war in its broadest sense. A *defensive* war is admitted. The modern view seems only to deny all forms of *aggressive* war. This new variation can surely be welcomed by all who believe in the necessity of a long peace if Europe is to return to a state of settled prosperity.

EUROPEAN NATIONS

This seems to be the idea gaining ground in the late Central Powers of the Great War, where peace for the present is imperative.

The neutrals of the war, Sweden, Norway, Denmark, Finland, the Netherlands and Switzerland regard the problem in the same way. The value attached to peace, in view of their lack of territorial or other possessions for which war might be waged, resides in the desire to maintain a prosperous national and private existence.

But Italy and Turkey envisage the question differently. Italy's outward patriotic manifestations, however, should not be regarded as

more than the appeal of a strong government to the nation to prepare itself to support strong decisions. The Soviet Union can only be regarded as an opponent of every guaranteed peace, as well as of all more recent international conventions. The attitude of these three Powers, Italy, Turkey and the Soviet Union in fact seems to spring from two causes :—

- (i) Their own unsatisfactory situation ;
- (ii) The possession of a strong centralized form of government which is wholly free from the influences of "timid majorities."

Nevertheless, in spite of all advantages accruing from a concentration of power, as being the most practical form of human government, despotism and its fruits cannot be regarded as offering any final solution to the questions under review or in moulding the national feeling towards such a solution.

The attitude of France and her satellites is clear from her policy. In spite of Articles 10—16 of the Covenant of the League, France has tried to extort special guarantees from Britain and the United States for her "security." Failing this she has concluded military alliances with Belgium, Poland and the Little Entente. Next she attempted by means of the Geneva Protocol of 1924 to secure further guarantees ; then, by the Locarno Treaty she permitted Britain to guarantee her Eastern frontier ; finally, she opened private negotiations with the States for a Treaty prohibiting war between these two countries. Driven into the universal Pact by Kellogg, she struggled to obtain recognition of her threatened "special" rights, until the States assured her that the right to wage a "defensive war" was not impaired by the Treaty. Accordingly in the event of hostilities the League of Nations may thus bring about this definition of the "aggressor" and everything will be as it was ! The ceremonial denunciation of war by the Kellogg Pact is thereby rendered innocuous. This argument applies still more strongly to Poland ; and in both cases applies still further to their military circles irrespective of the official policy of both countries. Poland's action on the Silesian frontier and at Vilna cannot be overlooked, since official policy can seldom afford to disown independent nationalistic outbursts, such as those of Dr. Jameson, d'Annunzio, Korfanty, Selijowski. What has been the final outcome of any of these ?

If the policy of these states be gauged by their attitude towards disarmament and war, we can only find a clear indication what prospect there is of a continuation of the present one-sided armed peace in Europe. These states are the profiteers of the present condition of Europe in which the defencelessness of the Central States is but a stimulus to ultimate unrest.

GREAT BRITAIN

England and the Dominions cannot be regarded as any longer forming part of the large French group. Her Labour Government, now in power, would be totally untrue to itself if it took any decision that might approach a breach of peace. On the other hand, it is possible to trace some appreciable resemblance to French ideas as may be seen in the exchange of notes concerning the Kellogg Pact. In the Note to America of 19th May, 1928, Britain followed French conceptions of "Defence" and "Treaty Pledges" consequent on the League and Locarno. Moreover, she laid down the specific reservation that the care of British interests in specified regions—and here it is possible to include Belgium, her colonies and many other places—might need protection. It is, of course, true that at the moment, owing to the prevalent state of depression, Britain needs peace and would only participate in a "War of Sanctions" with the greatest reluctance, since such action must involve her in antagonism to the United States.

THE UNITED STATES

Let us turn to the United States, who now hold the keys to the present international situation. The States are principally interested in war at sea; they have progressively developed their protest against the right of capture at sea into the denunciation of all war (Kellogg Pact). Since their Declaration of Independence they have demanded the freedom of the sea, that is, free passage and free goods outside war contraband. They fought Britain on that point in 1812-15. They have repeatedly emphasised their claim, and renewed it afresh in the Great War. In Hoover, they have a spokesman who extended their protest against the blockade. The freedom of the seas is synonymous with the huge growth of American oversea trade. The denunciation of war, made in the Kellogg Pact, judging by unmistakable pronouncements in the Government press (see *Washington Post* for December, 1929), extends against a "War of Sanctions," and particularly against the isolation of the aggressor from all sources of supply, that is, the blockade enforced by the League of Nations, as named in Article 16 of the Covenant. Although Kellogg, in his exchange of Notes leading to the Pact which has been signed by fifty-six states, admitted the possibility of defensive war, it is perfectly obvious that states may not accept without demur the decisions of the League, or even of a special tribunal, touching "aggression"; rather the States might go so far as to oppose such decisions by force, if they were of a contrary opinion. It seems as though the States were drifting into the role of a superior impartial Court of Justice, and thereby retaining to themselves the right of giving

a final judgment. Whether this power may be exercised in the sense of the highest justice or in the sense of highest national advantage is a question of belief or of opinion dependent on how far we derive our conclusion from a study of the psychology of the "Eastern," "Middle" or "Western" States, and are able to deduce any useful result therefrom. It is important to note that the trend of thought, which is connected with Senator Borah, regards disarmament as merely a prelude and hopes to attain the unarmed comity of nations through the effective renunciation of war. As part of this prelude, begun in Washington in 1922, the parity of naval strength with Britain and the ratio of naval power between the five naval states is to be rendered effective. Thereby a war with Britain is rendered, if not impossible, at any rate most hazardous. Such a war, in spite of what is said in England, is not impossible; indeed, in conjunction with Japan and European allies, it might even become probable. Be that as it may the States are prepared, under the proviso, to disarm to any desired extent. But do they not run the risk, if they press their proposals too far, of finding the whole world arrayed against them? The total disarmament of the world might perpetuate the American commercial "papacy,"¹ since total disarmament must remove all possible means of resistance.

It is at this focal point that all lines of world politics, including all economic lines, now meet. Hence the London Naval Conference assumes an outstanding importance. Therefore France desires to rob this Conference of this importance and to transfer her decisions to the Geneva stage. There she will doubtless combine the hypothetical results of the Conference with the celebrated *interdépendance des armes*; all this to gain time although she has loudly proclaimed that naval must precede land disarmament.

We thus find that the original problem concerning the influence of the idea of the Great Peace on practical politics still comes back to the old game of the interplay of forces. Consequently we come to the cynical conclusion that the inner conscience operating can only regard all this interlude as a reaction from the experiences of actual war. Who can answer that question of destiny as to whether the public opinion of the whole world will allow itself to be led by the opinion of the middle Western States so far as to transform that interlude into really serious action? If so, they will place themselves above all the traditions of armed rivalry that have hitherto animated European States. Or is it that unwillingly and unknowingly the latter may adjust differences and form a defensive union?

¹ See J. Carter: "Painless Imperialism."

IV. THE OFFICIAL FRENCH VIEW

THE French Government, on the 21st July, published a Memorandum on the question of disarmament which had been approved by the Council of Ministers and forwarded to Geneva. They desired to "recall the essential principles of the policy to which they remain faithful."

French policy, it is stated, is in strict accord with the dispositions of the Covenant and of the Treaties, and with the doctrine laid down by successive Assemblies of the League of Nations. Within a system of international co-operation, such as the League of Nations, a reduction of armaments may become more important to each State as mutual assistance against aggression becomes better organized, more certain, and more rapid. But it has nowhere been said that methods and strengths of armament imposed on certain States by Peace Treaties should be adopted by others. Count must be taken of the geographical situation and special conditions of each State.

France, having been thrice invaded within a century, should have at her disposal land forces sufficient to cover her territory with the surety and rapidity with which the great maritime Powers are protected by their naval forces. In addition to the defence of the mother country, she has to maintain order in a colonial empire twenty-three times the size of that country, scattered throughout the world and inhabited by a population of over 60,000,000. For this, and in order to preserve her overseas communications, France requires land, naval and air forces closely allied and interdependent.

Taking into account the improvement in the conditions of security in Europe and the world, the French Government has voluntarily slowed down her naval and air programmes, and has reduced the effectives of the instructed reserves immediately available for defence by 60 per cent. since 1921. The French Navy has been reduced from 750,000 tons in 1921 to 628,603 tons in service and construction to-day. Military service has been reduced from three years to one year, and the home army from 483,672 men in 1921 to 270,812 men in 1931; of the latter only 163,000 are trained troops. The Air Force has only been increased since 1923 by 30 units—from 1,180 to 1,210 aeroplanes.

The problem of the general limitation of armaments is much more political than technical; it cannot be solved by measures of arbitrary percentages for reduction nor by empirical adjustments. Reduction of armaments implies the confidence which arises from respect of treaties and the guarantee that no State will seek occasion in the Conference of 1932 to modify the order established by international contracts to its

own profit, but at the risk of imperilling peace. That any State should find itself insecure, or that it should remain neutral is hardly justified to-day in the face of the Covenant of the League of Nations and the Kellogg Pact.

In the French view, the Protocol of Geneva would afford a preferable basis for progress, as linking together the problems of arbitration, mutual aid, and limitation of armaments. The isolated treatment of the problems can only lead to fragmentary and, perhaps, confused answers. The Government are ready to consider universal engagements of mutual assistance, combinations of regional accords, the constitution of an international force, or the simultaneous employment of these various systems. They are ready to collaborate unreservedly in any system for the general organization of peace, comprising such precise undertakings of mutual assistance in the case of aggression as would permit of further reductions of armaments.

They are convinced that the Conference of 1932 will not allow this occasion for solving the real problem—that of organizing peace—to slip by.

SPAIN

SINCE the Revolution the new Spanish Government has been engaged in trying to consolidate its position. Although the Revolution was, generally speaking, peaceful a certain amount of rioting and bloodshed occurred in different parts of Spain, and at one time it appeared as if the subversive elements of the extreme left might gain the upper hand; but the Government has, on the whole, really succeeded in restoring law and order.

Serious anti-clerical rioting broke out in Madrid on 10th May, and continued the next day, also spreading to many towns in Spain. Seven monasteries and convents were destroyed by fire in Madrid alone, and some others in Zaragoza, Alicante and Malaga. Tranquillity was restored by the evening of the 12th. Cardinal Segura, the Primate of Spain, left Spain for France and he was followed by his friend and confidant, the Bishop of Vitoria, on the 18th, when requested by the Government to leave the country.

On May 8th a decisive step towards religious freedom in Spain was made when the Cabinet approved a decree declaring that henceforth religious instruction will not be obligatory in primary schools. Religion will only be taught to those children whose parents request it.

The Provisional Government has set about reducing the armed forces of Spain to a size proportionate to the needs and resources of the nation.

It began by publishing a decree regarding the pledge of allegiance demanded of the Army towards the new régime.

In the preamble to the decree it is stated :—

"The Revolution of the 14th April, which by the will of the people established the Republic in Spain, extinguishes the oath of obedience and loyalty which the armed forces of the nation had sworn to the institutions which have now disappeared. It is not in any way to be understood that the nation's forces on sea and land were bound, by that oath, by ties of allegiance to a dynasty or to a person. Article 2 of the Constitutional Law states that 'the mission of the Army is to maintain the independence of the country.'"

"The Government of the Republic has pleasure in making known its satisfaction at the behaviour of the 'military' during the recent crisis."

"The Republic, respecting individual conscience, does not enforce this promise of allegiance. Those who hope to serve her must make it ; those who refuse to do so will prefer to leave the service. The Republic is for all Spaniards, but only those may serve her in confidential posts who unreservedly and fervently adopt the *régime*. The withdrawal of those who refuse this allegiance does not imply sanction but the ending of their engagement with the State."

The decree then went on to specify the nature of the pledge demanded of the Army :—

Article 1.—All general officers on the active or reserve lists, and all senior officers and officers who have retired or been dismissed from the army, must, within four days of the publication of this decree, make a solemn promise of allegiance and loyalty to the Republic.

Article 2.—The text of the pledge will be—

"I promise on my honour to serve well and faithfully the Republic ; to obey her laws and defend her with arms."

Article 3.—In all corps and military establishments officers will sign the pledge in the presence of the commanding officer or his delegate.

This article further refers to the facilities provided for officers, whether sick or abroad, to sign the pledge. Those abroad will do so in Spanish Embassies and Consulates.

The next measure has been to offer facilities for all officers, so desiring, to pass to the reserve or to the retired lists on full pay. This applies to the Army, the *Guardia Civil* and the *Carabineros*. Further, the entrance

examinations to the General Military Academy for the June term, for which 100 vacancies had been announced, were cancelled.

A beginning has also been made with the disbandment of two monarchical units: (a) The Royal Escort; (b) The Royal Corps of Halberdiers.

The officers of these corps are to be placed in the situation of "compulsorily unemployed." The other ranks of the Royal Escort will be distributed amongst the other cavalry units in the Madrid garrison. The other ranks of the Halberdier Corps will remain on full pay at the disposal of the Captain-General of the 1st Region.

Lastly, the Government has ordered the disbandment throughout Spain, with the exception of Catalonia, of the *Somatenes*, a semi-military corps originally created about 1875 as a local force in Catalonia. In 1923 General Primo de Rivera increased its organization on a national scale for the purpose of assisting in the suppression of disorders. The personnel carried a rifle, but wore no special uniform. The regular army officers who were detailed for service with this corps, numbering some 300, are being placed on the "compulsorily unemployed" lists.

District commissions are being appointed to check the disarming of the members of the corps and the handing over of accounts and property. The colours are being placed in the Infantry Museum.

The Government has also ordered that attendance at Mass in corps and military establishments shall in future not be compulsory. Officers and other ranks who wish to attend Mass will do so without arms and not in formation, when the service is held inside the barracks. When held outside barracks tactical units will be formed, parade dress will be worn, but no arms carried.

CARLISM

For the past two generations, and until the beginning of last month, Carlism had been considered a lost cause; it had long since ceased to be regarded as a factor in practical politics.

The departure of Alfonso XIII from Spain and the institution of a provisional Republic have, however, caused the reappearance of Carlism on the political stage, and the Pretender, Don Jaime de Bourbon, has recently issued two proclamations to the Press, in which he re-states his claim to be the legitimate monarch of Spain.

He calls on Spaniards to stand by the result of the elections and to support the Republic in the event of a Republican victory, or himself in the event of a victory of the Monarchists.

In one of his proclamations he points out the great danger to Spain of Bolshevism, of which he is well qualified to speak from his long residence in Russia.

NAVAL MUTINIES

On the 10th May, the men of the battleship "Jaime I" mutinied at Ferrol as a protest against bad food.

At eight o'clock, in their working clothes, they abandoned the ship and paraded the streets cheering the Republic. They laid their complaints before the officers of the Republican Party, and were informed that they would be transmitted to the central Government.

Continuing their demonstration they went as far as the Town Hall, and had an interview with the Mayor, who also telegraphed to Madrid. The men also complained of the overbearing conduct of the second officer in command. They then returned to the ship.

The Captain-General of the Department had meanwhile arrived, and opened an enquiry. The mutineers were placed under arrest.

An affair in some ways similar occurred at Cartagena, where sailors on leave went to the Town Hall to complain of the officer in command of the arsenal, and others whom they accused of ill-treating the men, punishing them unnecessarily, stopping leave, and obliging them to attend Mass on Sundays, as well as supplying them with bad food.

TURCO-SOVIET NAVAL PACT

FOLLOWING closely on the Franco-Italian naval agreement, comes the news of a Turco-Soviet pact for the limitation of armaments in the Black Sea. Possibly pique at not being invited to the London Naval Conference and a desire to show the world that Russia and Turkey also can contribute to the cause of peace, may be the reason for the following pronouncement:—

"Russia and Turkey being desirous of consolidating the pacific and friendly relations existing between them, and being firmly convinced that the only guarantee of lasting peace is the effective reduction of all kinds of existing armaments and wishing to manifest their unshakeable resolution to bring about a universal reduction of armaments, have considered it desirable, in order to furnish a new proof of the mutual confidence so happily existing between the two countries, to complete Article 2 of the Protocol of the 17th December, 1929, by the following reciprocal agreement—

'Neither party will lay down any fighting naval unit intended to strengthen its war fleet in the Black Sea or contiguous waters, nor place an order for such a unit in a foreign yard, nor will it take any other measure which will result in an increase in the present composition of its war fleet in those seas without giving the other contracting party six months notice.'

This agreement presumably does not apply to Turkish naval construction which has been laid down in Italy, i.e., 4 destroyers, 2 submarines, and 3 submarine chasers.

CORRESPONDENCE

THE CO-ORDINATION OF NAVAL, MILITARY, AND AIR FORCES

TO THE EDITOR OF THE R.U.S.I. JOURNAL.

SIR,—The co-ordination of naval, military and air forces in defence organization, in strategy and in tactics is a problem which is frequently discussed without, so it appears, an advance in its solution being generally perceived. The writer believes that progress in co-ordination of tactics is satisfactory within somewhat narrow limits and that improvement in co-ordination of strategy only waits upon a recognition of the co-ordination in organization that has already been achieved. It might appear strange that such recognition is wanting if it were not universally true that recognition of existing circumstances is the first and most difficult step in the solution of any problem.

Major Fink's article in the February JOURNAL¹ presumably represents the views of a large number of officers, but it is improbable that they would command universal support. "Jundi" and "Taiyari," in their articles, for instance, exhibit widely divergent views on one aspect of this subject. By itself this controversy about past events and the lessons to be drawn from them might be disheartening if it were not true that the controversy also shows that a great approximation in valuation has been reached since the sharp divergences of opinion in the Cairo Conference in 1921. Major Fink, for example, can write of the Aden operations that the results have been eminently satisfactory, expeditiously carried out, and at small cost; and of certain operations on the North West Frontier, that they were brought to a termination with the utmost speed, with the minimum of effort and at slight cost. It is probable, therefore, that complete agreement will come with the passage of time, and that the accumulation of evidence will tend to hasten the assimilation of its meaning. Meanwhile, it would seem, the wise man should refrain from a gratuitous incursion into the subject; but even as there are many voices in business proclaiming that English methods fail because they do not recognise altered circumstances, so, surely, it may be forgiven him, if one more writer in military affairs points to a similar failure in grasping facts.

Progress in the co-ordination of the Fleet Air Arm with the action of other naval forces, and of the Army-Co-operation Squadrons with other military units has shown steady development since the Government, by their adoption of the Report of the National and Imperial Defence Committee (Cmd. 2029) in 1923, defined the functions of the three Services. The functions of the three Services were defined; the allotment of strength in aircraft to each was laid down; the tactical employment of the various units is set out in manuals approved by the several departments concerned. Where there is controversy it is due to the healthy ferment of new ideas; where there is dissatisfaction it can be traced to the limitations imposed by economy, though each Service thinks that economy should be practiced in the aircraft of the other two Services and not in its own

¹ "Regional Control and the Co-ordination of Air and Land Forces," By Major R. H. L. Fink, O.B.E., M.C.; JOURNAL for February, 1931, p.18.

aircraft requirements. The Navy and Army are able in their own commands to study and develop the co-ordination of the tactics of air forces with those of other arms, and the Air Force is able in Iraq and Aden to co-ordinate the use of land forces with the employment of aircraft in the primary role of maintaining order which is entrusted to air forces in those semi-civilized countries.

But Major Fink towards the end of his article suggests that there are a number of officers in the Army who think that for the strategical employment of military and air forces some organization other than the present one is required. He proposes that the Air Force should be brought within the Army organization, both Services preserving separate identities—assuming that it is possible for the smaller to do so—but being co-ordinated by a common Council. That proposal omits the concern of the Navy in the matter, and neglects the existing system for the co-ordination of all three Services which was laid down in the White Paper (Cmd. 2029) referred to above. The proposal in fact goes back to the period between the war and 1923 when several attempts were made to upset the organization set up in 1917. But the various enquiries that have been held have all upheld that organization on the grounds both of military efficiency and economy, and have in reply to the demand for a Ministry of Defence to co-ordinate all three Services formed the three Chiefs of Staff into a body under the chairmanship of the Prime Minister, the Chairman of the Committee of Imperial Defence, for the co-ordination of strategical advice.

It therefore appears that Major Fink is behind the times; if he advocates a change, a retrogression to 1914-17, he must show first that the various enquiries were mistaken in their conclusions, and secondly that the existing organization has been worked with goodwill and has failed. As regards the first he only repeats arguments that the previous enquiries have disproved; as regards the second, he seems unaware of the existence of certain sub-committees of the Committee of Imperial Defence which are in fact combined staffs of the three Services.

The Royal Flying Corps was originally formed as a separate Service with naval and military Wings, but had been broken up before the war, and the Wings became parts of the older Services. During the war it became obvious that the original conception was sound and the Royal Air Force was formed. Now that the lessons of the war are being forgotten and the role of the Air Force in peace expands there is a strong temptation for the older Services to exercise pressure to return to 1914. The Navy has seconded officers to the Fleet Air Arm, and by a process of co-operation, exercises operational control over it; but the Army withdrew the officers that were seconded to the Army Co-operation Squadrons and some military writers express dissatisfaction with the results of this action. The remedy is clear, but is not to be found on reactionary lines.

I am, Sir,

Yours, etc.,

K. M. G.

June, 1931.

THE HIGHER STUDY OF WAR

TO THE EDITOR OF THE R.U.S.I. JOURNAL.

SIR,—May I endorse very sincerely the points made by Vice-Admiral W. H. D. Boyle in his lecture on "The Higher Study of War in the Services."

The first problem involved appears to me to be what I may term the adjustment of human material, and I suggest that the ordinary officer in the Services would make a Staff Officer in the same time as is now devoted to training those who go

to our Colleges under the present system of selection. If the entrance into Colleges to study the higher problems of war could be made in rotation, potential Nelsons or Wellingtons might be found amongst the average sailors, soldiers and airmen. Do we not tend to overlook the "practical man" engaged in duty where he cannot think of a Staff College?

It was pleasing to note the lecturer's allusion to the London School of Economics. Should not every officer make a study of the problems dealt with at this School? If this were done on the lines mentioned by Sir George Milne, it should provide mental gymnastics worthy of the best military brains.

I am Sir,

Yours, etc.,

CLAUD WEBB,

Captain, Manchester Regiment.

Oldham, May, 1931.

OFFICIAL HISTORY OF THE WAR, WESTERN FRONT—Volume I.

TO THE EDITOR OF THE R.U.S.I. JOURNAL.

SIR,—As soon as the French official account of the Battle of the Marne appears, which is expected in the autumn, it is proposed to proceed to a revision of the first volume of the Official History (which covers the operations up to the move from the Aisne to Flanders), so as to include what is new and essential in the French, German and Austrian Official Histories. This will give an opportunity to insert corrections and additions to the British narrative. I should be glad, therefore, if any officer who has any changes to suggest would communicate with me.

Similar revisions of the other volumes will not be necessary, as in compiling them I asked for and received assistance both from the French *Service Historique* and the German *Reichsarchiv*, which was not the case with Volume I.

I am, Sir,

Yours, etc.,

J. E. EDMONDS,

Brigadier-General.

HISTORICAL SECTION (MILITARY RESEARCH),

COMMITTEE OF IMPERIAL DEFENCE.

AUDIT HOUSE,

VICTORIA EMBANKMENT, E.C.4.

6th July, 1931.

REGIMENTAL HISTORY OF THE ROYAL DRAGOONS

TO THE EDITOR OF THE R.U.S.I. JOURNAL.

SIR,—A new history of The Royal Dragoons is being written by Mr. C. T. Atkinson, and I would crave the medium of the R.U.S.I. JOURNAL to ask those who may have diaries, documents, family papers, pictures or prints of the Regiment, or of former officers to communicate with me. I need hardly say that anything lent for this purpose will be handled with the greatest care.

There is a manuscript journal that it is important to find, namely one kept by General James Johnston of the Campaign in 1760, when in command of The Royals. General Johnston became Governor of Quebec, married a daughter of the first Earl de la Warr, and was buried in Westminster Abbey. This journal was in

the hands of General de Ainslie when he wrote a history of the Regiment in 1887, but since then all trace of it has been lost. If there is any member of the family who can tell me where it is now, I should be very grateful.

I am, Sir,

Yours, etc.,

ERNEST MAKINS, *Brigadier-General,*
Colonel of The Royal Dragoons.

180, QUEEN'S GATE, S.W.7.

9th July, 1931.

ARMY MESS LIFE A HUNDRED YEARS AGO

TO THE EDITOR OF THE R.U.S.I. JOURNAL.

SIR,—At a time when many old officers are deploring the present decadence of Army Mess life, might I draw your attention to the following extract of a letter addressed to the "United Service Magazine," in February, 1832, by one "Priam":—

"And next, Sir, I would speak of the mess-room, which in days of yore was wont to be held as sacred, classic ground, where no unhallowed (that is improperly dressed) fool would dare intrude. Now, Sir, however, all is changed, and you see officers (for I cannot call them *gentlemen*) in dressing gowns, without braces, in slippers and unwashed, reading the papers as coolly and unconcernedly as if they were in their own chambers; not to say a word of the untidy manner in which they throw off their swords, belts, etc., about the place. . . . Swearing by uncouth oaths, telling brutal stories, talking indecently and improperly before servants, appears to be also the order of the day; and the disgusting way in which many act is a source of infinite annoyance. A young man here, otherwise well enough, who is uncommonly conceited, and thinks every thing vulgar and every person plebeian but his own and himself, is constantly talking loud, making unseemly noises with his lips, and eating in such a manner, that you might fancy yourself in a pig-sty with some fifty swine chumping around you."

Things seem to have righted themselves for once anyhow! Will that console the pessimists?

I am, Sir,

Yours, etc.,

HISTORICUS.

June, 1931.

NAVY NOTES

GREAT BRITAIN

FLAG APPOINTMENTS.

PORTSMOUTH COMMAND.—Admiral Sir Arthur K. Waistell, K.C.B., succeeded Admiral of the Fleet Sir Roger Keyes, Bt., G.C.B., K.C.V.O., etc., as Commander-in-Chief, Portsmouth, on 9th June, 1931. Rear-Admiral H. K. Kitson, C.B., succeeded Vice-Admiral L. A. B. Donaldson, C.B., C.M.G., as Admiral-Superintendent Portsmouth Dockyard, on 13th May, 1931.

REAR-ADMIRAL, SUBMARINES.—Rear-Admiral C. J. C. Little, C.B., has been selected to succeed Rear-Admiral Dunbar-Nasmith, V.C., C.B., as Rear-Admiral, Submarines, to date 2nd September, 1931.

THIRD BATTLE SQUADRON.—The flag of Rear-Admiral G. F. Hyde, C.V.O., C.B.E., Rear-Admiral Commanding Third Battle Squadron, was struck at sunset on 5th May, 1931, at Devonport. The Third Battle Squadron then ceased to exist, and the "Marlborough" was transferred to the administration of the Commander-in-Chief, Plymouth.

COAST OF SCOTLAND.—Rear-Admiral the Hon. William S. Leveson-Gower, D.S.O., succeeded Rear-Admiral T. J. Hallett, C.B., C.B.E., as Rear-Admiral and Commanding Officer, Coast of Scotland, on 6th July.

SENIOR OFFICER, YANGTZE.—The appointment of Rear-Admiral F. F. Rose, D.S.O. as Rear-Admiral and Senior Naval Officer, Yangtze, is cancelled. Rear-Admiral Richard A. S. Hill, C.B.E., is to take up this command, in succession to Rear-Admiral Colin K. MacLean, C.B., C.V.O., D.S.O., to date 27th August.

MEDITERRANEAN FLOTILLAS.—Rear-Admiral F. F. Rose, D.S.O., has been appointed Rear-Admiral (D) commanding the Destroyer Flotillas of the Mediterranean Fleet, in succession to Rear-Admiral C. M. Forbes, C.B., D.S.O., to date 20th November.

CHATHAM DOCKYARD.—Rear-Admiral C. W. Round-Turner, C.M.G., is to be Admiral-Superintendent, Chatham Dockyard, in succession to Vice-Admiral A. J. B. Stirling, C.B., to date 1st October.

REAR-ADMIRAL, MALTA.—Rear-Admiral the Hon. Matthew Best, C.B., M.V.O., D.S.O., succeeded Vice-Admiral F. H. Mitchell, C.B., D.S.O., as Rear-Admiral, Malta, on 13th July.

FLAG LIST CHANGES.

Vice-Admiral Arthur J. Davies, C.B., was placed on the Retired List, at his own request, to date 1st June. Rear-Admiral Barry E. Domville, C.B., C.M.G., who succeeded him in the command of the Third Cruiser Squadron, Mediterranean Fleet, on 2nd February, was promoted to Vice-Admiral, to date 1st June, and reappointed on promotion. Captain Francis G. G. Chilton, A.D.C., was promoted to Rear-Admiral, to date 1st June.

In consequence of the death of Rear-Admiral W. A. Egerton, C.M.G., on 18th July, Captain D. F. Moir, D.S.O., A.D.C., was promoted to Rear-Admiral, to date 19th July, and placed on the Retired List, 20th July. Captain A. E. F. Bedford, A.D.C., has been promoted to Rear-Admiral, to date 20th July.

PERSONNEL.

TACTICAL COURSE INCREASED.—The length of the Tactical Course has been increased from nine to ten weeks. This Course is held at the Tactical School, Portsmouth, and is open to executive officers of the rank of Commander and above. There are three courses a year.

LOWER DECK PROMOTION.—The decision of the Admiralty on the Report of the Committee under Vice-Admiral Frank Larken, C.B., C.M.G., appointed to inquire into the working of the Mate Scheme of promotion to commissioned rank from the lower deck was announced in the House of Commons on 20th May by Mr. Alexander, the First Lord. It has been decided to drop the title of Mate and make use of the ordinary title of Sub-Lieutenant for officers from the lower deck. By a system of intensive tuition in educational and professional subjects in the early years of a young man's service, it will be possible for him to reach commissioned rank in the executive branch at about the age of 21, and 22 for engine-room artificers and rather over 25 for stokers. The time spent at Greenwich College is to be increased from three months to nine months for executive officers. The course for engineer officers will remain as at present.

PROMOTION TO INSTRUCTOR CAPTAIN.—It has been decided to abolish the service qualifications for promotion to the rank of Instructor Captain in article 292, King's Regulations and Admiralty Instructions (twenty years' service as Instructor Lieutenant and above, including eight years' sea service, or five years' sea service in the case of officers entered before 1905). The Board do not, however, contemplate the promotion of an Instructor Commander with less than twenty years' service, except in special circumstances.

LIEUTENANT-COMMANDERS' RETIREMENTS.—On 5th June, it was announced that applications might be forwarded from officers to be included in the second batch to retire under the special scheme promulgated in February (see page 433, of the May number of the JOURNAL). Retirements will date on or about 1st October next. Originally, the scheme applied to Lieutenants of 1923 seniority and Lieutenant-Commanders of seniority of 1923 and later seniorities. In the announcement on 5th June, it was confined to Lieutenants of 1923 seniority and Lieutenant-Commanders of seniority of the second half of 1924 and later years.

ADVANCED COURSE PRIZES.—A prize of £20 has been awarded to Lieutenant H. N. S. Brown, R.N., H.M.S. "Excellent," on the result of the final examination held on completion of the advanced gunnery course at the R.N. College, Greenwich, in March last. A prize of £20 has been awarded to Lieutenant J. Hext Lewes, R.N., H.M.S. "Defiance," on the result of the final examination held on completion of the advanced torpedo course at the College.

MATERIAL.

1930 PROGRAMME BEGUN.—H.R.H. Prince George laid the first keel-plate of H.M.S. "Achilles" at the yard of Cammell Laird and Co., Birkenhead, on 11th June. This is the first of the three cruisers authorised in 1930 to be begun. The "Neptune" and "Orion" will be begun at Portsmouth and Devonport Dockyards respectively in the autumn. Of the eight destroyers in the 1930 programme, the "Dainty" and "Delight" were laid down by the Fairfield Company, Govan, on 20th and 22nd April respectively.

"EXETER" COMPLETED.—The cruiser "Exeter," authorised in the 1927 programme, was commissioned at Plymouth on 21st July with a Devonport crew as an independent command for service in the Second Cruiser Squadron, Atlantic

Fleet, in place of H.M.S. "Hawkins." The first visit of the ship after commissioning for service was to Exmouth.

LAUNCH OF THE "ROCHESTER."—The sloop "Rochester," the last of the four of the 1929 programme, was floated out of dock at Chatham on 16th July.

ORGANISATION AND DISTRIBUTION.

NEW SOUTH AMERICAN DIVISION.—The Admiralty announced on 21st May that it has been decided that two of the cruisers of the America and West Indies Squadron shall form a South American Division of it, under a Commodore, second class. These vessels will cruise in South American waters, but will rejoin the main division of the Squadron annually for exercises. It is intended that the new arrangements shall take effect when H.M.S. "Durban" arrives on the station to relieve H.M.S. "Despatch," probably in September, and that the Commodore shall fly his broad pennant in the "Durban." Captain R. H. O. Lane-Poole, O.B.E., hitherto Captain of the R.N. College, Greenwich, has been selected for this appointment. His appointment to the "Durban" is dated 24th August.

EXERCISES AND CRUISES.

BRITISH VISIT TO KIEL.—In response to an invitation from the German Government, H.M.S. "Dorsetshire," flying the flag of Rear-Admiral E. A. Astley Rushton, C.B., C.M.G., and H.M.S. "Norfolk," both belonging to the Second Cruiser Squadron, Atlantic Fleet, visited Kiel from 4th to 11th July, on their return from the usual summer cruise to the Baltic. A full programme of hospitality was arranged in their honour, beginning with a ball on the evening of 4th July at the Imperial Yacht Club. The cruisers were open to public inspection, and many thousands came on board. On one day, a hundred Kiel children were entertained in the "Norfolk," by Captain C. B. Prickett.

ATLANTIC FLEET CRUISES.—The Atlantic Fleet was at Invergordon during May, and at Scapa during the first week of June. It then dispersed for the customary visits to coast towns and resorts, and the Second Cruiser Squadron, with the "Centaur" and Fifth Destroyer Flotilla, proceeded to the Baltic. During the first week of July, H.M.S. "York," Captain W. N. Custance, visited Amsterdam. The squadrons and flotillas reassembled at Torbay for the annual regatta between 10th and 17th July, and afterwards visited a number of South Coast resorts before proceeding to their home ports. Summer leave was ordered to be granted from 25th July to 1st September.

THE FLEET AIR ARM

The procedure agreed upon between the Admiralty and the Air Council for holding naval courts of inquiry on matters concerning the Fleet Air Arm whilst under naval discipline, and for reporting casualties among the personnel was described in Fleet Orders, dated 19th June. The circumstances in which naval courts of inquiry may be necessary generally fall under one of the following headings:—(a) Flying accidents; (b) Accidents other than flying accidents; and (c) Certain cases of losses of R.A.F. money or stores.

H.M.S. "EAGLE."—The aircraft-carrier "Eagle," Captain H. E. Dannreuther D.S.O., returned to Devonport in May from her cruise to South America to participate in the special events connected with the Industrial Exhibition at Buenos Aires. On the expiration of foreign service leave, she was ordered to prepare for large repairs and to be paid off into dockyard control at Devonport.

The following flights were disembarked to the R.A.F. Base, Gosport:—No. 402 (Fleet Fighter) Flight; and No. 408 (Fleet Fighter) Flight, ex H.M.S. "Glorious." No. 448 (Fleet Spotter Reconnaissance) Flight and No. 460 (Torpedo Bomber) Flight were transferred from the "Eagle" to the "Glorious" with effect from 4th May, 1931.

LOSS OF THE "POSEIDON."

The submarine "Poseidon," Lieutenant-Commander B. W. Galpin, was rammed and sunk on 9th June by the Chinese coasting steamer "Yuta," twenty-one miles north of Wei-Hai-Wei. Five officers and twenty-six men were saved. Twenty ratings lost their lives. The "Poseidon" was sunk while operating on the surface in full buoyancy. She was holed on the starboard side forward of the conning tower, and sank by the bow in about two minutes. The majority of the crew were able to escape by the conning tower hatch, but six made good their escape from the fore part by means of the Davis submarine escape apparatus, two coming to the surface over two hours after the collision and four over three hours after. Unfortunately, two of the six men died from the effects of their ordeal. Divers worked on the wreck in from 115 to 120 feet, so far as the weather allowed, but on 15th June the salvage operations had to be abandoned owing to the fact that the vessel had become embedded in the mud of the sea bottom.

On 1st July, a Court-Martial at Wei-Hai-Wei found Lieutenant-Commander Galpin had been guilty of hazarding his ship, and he was dismissed from his ship and severely reprimanded.

In the House of Commons on 7th July, the First Lord, Mr. Alexander, paid a tribute to the magnificent behaviour of the six men cut off in the forepart of the vessel, and particularly to the resource and courage of Petty Officer Willis, who was in charge. When the collision occurred, and the order "Close watertight doors" was given, Petty Officer Willis called on his comrades to close the door of the compartment with themselves inside, as this might mean saving the ship. Subsequently, he ordered the men to put on their escape apparatus, making sure that they all knew how to use it. He then flooded the compartment, but it was over three hours before the hatch could be re-opened to enable the last of them to come to the surface.

On 15th July, the First Lord announced in the House of Commons that the King had been pleased to award to Chief Petty Officer Patrick Henry Willis the Albert Medal in gold, and to Able Seamen Vincent Nagle and Edmund G. Holt the Medal of the Order of the British Empire, Military Division. Petty Officer Willis was offered promotion to the rank of Warrant Officer; he preferred, however, to be rated Chief Petty Officer, and his promotion accordingly was confirmed as from 9th June. From the same date, the promotions were approved of Leading Seaman Reginald T. Clarke to be Petty Officer, and Able Seamen Nagle and Holt to be Leading Seamen.

FOREIGN NAVIES

FINLAND

NEW CONSTRUCTION.—The Finnish submarine "Iku-Turso" was launched at Abo on 5th May.

FRANCE

NAVAL ESTIMATES.—A Bill for a credit of £8,799,680 for new construction between the 1st April, 1931, and the 31st April, 1932, was debated in the Chamber on 18th June. In consequence of the opposition to laying down the proposed 23,000 ton battleship the vote was reduced to £4,000,000, and the Government promised not to start building a capital ship until the Chamber had had another opportunity to consider the question of design. Objections to the proposed design were raised both on political and technical grounds. As regards the former, fears were expressed that the ship would prejudice the outcome of the 1932 Disarmament Conference. On the technical side it was suggested that France should endeavour to secure agreement for a reduction in the maximum displacement of capital ships, failing which she should be prepared to build up to the limit of 35,000 tons.

The Minister of Marine protested strongly against Germany's intention to build eight 10,000-ton ships, and expressed the view that the Treaty of Versailles allowed her only six. He also supported his technical advisers who state that 23,000 tons is the minimum with which it would be possible to provide all the necessary offensive and defensive qualifications.

NEW CONSTRUCTION.—The sloops "Savorgnan de Brazza" and "D'entre-casteaux" were launched on the 18th and 21st June respectively.

The flotilla leader "Gerfaut" has carried out very successful steam trials and is reported to have attained a speed of 42.787 knots. She is one of the twelve 'Aigle' type of 2,441 tons, designed for 37 knots. These vessels have a new type of superheating apparatus which considerably decreases the amount of fuel consumed at high speeds.

The submarine "Persée" was launched at Caen on 22nd May and the submarine "L'Espoir" at Cherbourg on 18th July. The large submarine "Surcouf" is reported to have carried out satisfactory firing tests, but a fire which subsequently occurred on board is stated to have caused some damage.

RECONDITIONING OF BATTLESHIPS.—The "Courbet" has carried out trials after reconditioning; she is to relieve the "Paris" in the 1st Squadron, and the "Lorraine" when ready is to relieve the "Provence." Only one-third of the boilers of the "Lorraine" have been converted to burn oil.

TRAINING OF NAVAL RESERVE OFFICERS.—The Minister of Marine has decided to give Officers of the Naval Reserve the opportunity to receive further training by volunteering for periods of service in the formations or units to which they will be allocated on mobilization, or by volunteering to take part in such exercises on shore or at sea as they may desire.

GERMANY

LAUNCH OF THE "DEUTSCHLAND."—The first of the German post-war armoured ships was launched at Kiel on 19th May, and named the "Deutschland" by President von Hindenburg. Prematurely released by an over-zealous official, the vessel slipped down the ways while the President was still speaking, and he was unable to break the traditional bottle of champagne upon her bows.

NAVAL REVIEW.—From the deck of the new cruiser "Königsberg," President von Hindenburg on 20th May reviewed the German Fleet in Kiel Bay. Some fifty vessels in all were present, and after the President's arrival they formed into line

ahead and steamed past the "Königsberg." When all had passed, the cruiser turned and took station at the head of the fleet and led it back to its anchorage.

VISIT TO ENGLAND.—Commander Otto Stark, Superintendent of Physical Training in the German Navy, visited Portsmouth in June by permission of the Admiralty to study the British system of physical and recreational training

ITALY

NAVAL ESTIMATES.—The Italian Minister of Marine, Admiral Sirianni, presented the Naval Estimates on 27th May. The total amounts to about £17,000,000, being an increase of about £1,000,000. Admiral Sirianni stated that the Naval Programme for the forthcoming year had not yet definitely been decided upon, but he forecasted that Italy would be compelled to construct both battleships and aircraft carriers.

NEW CONSTRUCTION.—The destroyer "Folgore" was launched at Naples on 26th April. She is a vessel of 1,220 tons with a designed speed of 38 knots and an armament of four 4.7 and three A.A. guns and two triple 21-inch torpedo tubes.

The submarine "Fisalia" was launched at Monfalcone on 2nd May. She is a vessel of 6,000 tons with a speed on the surface of 16 knots and submerged 9 knots. Her armament is one 3.9-inch gun and eight 21-inch torpedo tubes.

TRAINING OF NAVAL CADETS.—In his speech on the Naval Estimates, Admiral Sirianni, replying to a suggestion that Italian Naval Cadets should be trained as formerly upon the lines of British Cadets at Dartmouth, pointed out that Dartmouth was not now the only means of entering the British Navy and that in his opinion the boys there were taken too young and given too narrow and professional an education. Italian Naval Cadets are taken from the secondary schools.

ROUMANIA

VISIT TO MALTA.—The Roumanian destroyers "Marasti" and "Marasesti," under the command of Vice-Admiral Prince Nicholas, arrived at Malta on 5th June on a five days' visit, to return that made to Constanza in August, 1930, by a British division under Rear-Admiral A. J. Davies.

SOVIET UNION

THE SOVIET FLEET.—The following article has been translated from the "Morskoi Sbornik" of February last:—

"In the last two and a half years our fleet has been increased by nine large and many small units. At the same time ten warships of an obsolete type have been paid off. The general tonnage of the fighting nucleus of the fleet has been increased by 6,000 tons. Of those that have been commissioned from war prizes is the large English submarine L55 which was sunk in the action with the Red Fleet in Korporia Bay during the Civil War. This has now been raised by us and reconditioned. In May of this year a submarine will be launched which has been built through the medium of the Komsomol.

"The personnel continues to improve. There is a considerable rise in the level of the political and military training. The sea staff of the coast defence and the summer hydro-aviation staff have been made up 95 per cent. from those who have completed courses at the naval schools.

"Among the officers 54 per cent. are members of the Communist Party and the Komsomol. Of the sailors 55 per cent. are Proletarian and 45 per cent. belong to the Communist Party and the Komsomol. In the training establishments for officers of the future, 81 per cent. will be recruited from workmen."

"The Baltic and Black Sea Divisions have carried out a series of foreign cruises. In 1929 our fleet covered a total distance of 354,000 miles. In 1930 a record of 447,000 miles was attained."

SOVIET MERCHANT FLEET.—It is stated that the Soviet Mercantile Fleet is insufficient to cope with the Government's export requirements under the five-year plan, and a new shipbuilding programme is to be introduced.

Six shipbuilding centres are to be established—in the Baltic, Black Sea, Sea of Azov and Caspian, and on the Pacific and Arctic Oceans. The construction of forty-four ships (total tonnage 175,000) this year is aimed at, as well as the laying down of an unspecified number of keels.

SPAIN

PRINCE AT DARTMOUTH.—The Infante Don Juan, third son of the King and Queen of Spain, entered the Royal Naval College, Dartmouth, as a Cadet on 30th April. He had passed his entrance examination for the Royal Navy of Spain nearly a year earlier.

NEW CONSTRUCTION.—The 10,000-ton cruiser "Canarias" was launched at Ferrol on 28th May. She is one of the largest warships yet built in Spain and carries eight 8-inch guns, a catapult and two seaplanes.

REDISTRIBUTION OF THE FLEET.—The Republican Government on the advice of the Naval Staff has placed the battleships "España" and "Jaime I" in the 2nd Reserve. The Commander-in-Chief of the Squadron has transferred his flag to the cruiser "Miguel de Cervantes" and the Rear-Admiral Chief of the Cruiser Division to the "Almirante Cervera." The Squadron is now organized as follows:—

First Division.

Cruiser	.. ..	"Miguel de Cervantes."
Cruiser	.. ..	"Libertad."
Cruiser	.. ..	"Republica."

Second Division.

Cruiser	.. ..	"Almirante Cervera."
Cruiser	.. ..	"Mendez Nunez."
Cruiser	.. ..	"Blas de Lezo."

ABOLITION OF CERTAIN RANKS.—The ranks of Captain-General and Admiral of the Fleet have been abolished.

RENAMING OF MEN-OF-WAR.—The Republican Government has re-named the following ships:—

Old Name.	New Name.
"Alfonso XIII."	"España."
"Reina Victoria-Eugenia."	"Republica."
"Principe Alfonso."	"Libertad."

SWEDEN

NEW CONSTRUCTION.—The destroyers "Klas Horn" and "Klas Uggle" were launched in June from Kochman's Yard at Malmo and the Naval Dockyard at Karlskrona respectively.

NAVAL AIR FORCE.—Admiral Akemark, Commander-in-Chief Coastal Fleet, has presented a memorial to the Government criticising the present methods of training naval airmen. In May, 1930, he had pointed out the defects in the system of training, but the Chief of the Air Force had not replied to his complaint. In the meantime the defects referred to had manifested themselves in many ways—for instance, airmen undergoing their first period of training for co-operation with the Navy had for nine months been trained solely on land machines. They were supposed to complete their training by the end of May, and their experience with seaplanes would obviously be inadequate.

The Chief of the Air Force had now suggested that there should be a still further reduction in co-operation training, and Admiral Akemark pointed out that the whole of the training with the Coastal Fleet was liable to be compromised, and refused to accept any responsibility for the consequences.

UNITED STATES

FLEET FLAGSHIP.—It was originally intended that the new 10,000-ton cruiser "Chicago" should replace the battleship "Texas" as flagship. This policy appears to have been changed and when the present Commander-in-Chief, Admiral Jethu V. Chase, is relieved in September next by Admiral Frank H. Schofield the battleship "Pennsylvania" which has recently been modernized will relieve the "Texas."

CRUISER CHANGES.—The "Chicago" on completing her final trials has been ordered to proceed from the Pacific to the Atlantic on becoming flagship of the Cruiser Division, Scouting Force. The cruiser "Augusta" relieved the battleship "Arkansas" in May as flagship of the Scouting Force when the "Arkansas" relieved the "Wyoming" as flagship of the Training Squadron. It is intended to transfer the cruisers of the "Omaha" class from the Scouting Force to form Cruiser Division III, Battle Force, as 10,000-ton cruisers become available to take their places. The "Concord," "Omaha," "Cincinnati" and "Milwaukee" will be so transferred shortly after the 1st January, 1932.

NEW CRUISERS.—The names of "San Francisco" and "Tuscaloosa" have been selected for the new cruisers Nos. 37 and 38, which were ordered in February, 1931, and October, 1930, respectively, the former from the New York Shipbuilding Co., Camden, and the latter from the Mare Island Navy Yard. These two vessels are the last 8-inch gun 10,000-ton cruisers which the United States may lay down until 1933 under the London Naval Treaty.

NEW SUBMARINE.—Tenders were opened at the Navy Department on 19th May for the construction of the "Cuttlefish," fleet submarine, formerly known as "V.9," and the contract was awarded to the Electric Boat Company, of Groton, Conn., for 3,297,000 dollars. The vessel is due for delivery within thirty months.

The "fleet submarines" of the "V" class built since the late War have been renamed as follows:—V.1, "Barracuda"; V.2, "Bass"; V.3, "Bonita"; V.4, "Argonaut"; V.5, "Narwhal"; V.6, "Nautilus"; V.7, "Dolphin"; V.8, "Cachalot"; and V.9, "Cuttlefish."

SUBMARINE STRENGTH.—On 1st July, 1931, the beginning of the 1932 fiscal year, there were 56 submarines in commission, representing a total standard tonnage of 51,840. Forty-three submarines were out of commission at the beginning of the 1931 fiscal year; of these, the "S.51" was sold to be broken up, while seven of the "R" class, five of the "O" class of a lake type, and three of the

"T" class were scrapped during the year at Philadelphia. The "O.12" has been transferred to the Shipping Board for experimental purposes.

The remaining twenty-six submarines, consisting of eight "H" class, eight "K" class, four "L" class and three "N" class, all of which are pre-war submersibles, and three of the "S" class, will be scrapped during 1931. The scrapping of these vessels, it will be recalled, is in accordance with the plan approved by the Secretary of the Navy on the 25th November, 1929.

At the beginning of the 1932 fiscal year, the submarines out of commission will consist of eleven "R" class, five "S" class, and nine "O" class, which are being paid off as a measure of economy, a total of 14,100 tons. This group of submarines will have to be scrapped prior to December, 1936, in order that the total tonnage of submarines may be reduced to the limit fixed by the London Treaty.

THE NAVAL BASE AT GUAM.—On 7th June, it was reported in Press messages from Washington that the use of Guam as a naval base was to be given up, under a new plan which aimed at reducing expenditure by 25,000,000 dollars a year. The island of Guam, the principal unit of the Marianne or Ladrone Archipelago, was ceded by Spain to the United States under the Treaty of Paris in 1898, and has been under the jurisdiction of the Navy Department. After the late war there were ambitious plans for the development of Guam as a naval base of the first class, but under the Washington Treaty the United States agreed not to fortify it, and it has remained merely a fuelling station.

CHANGES IN HIGHER POSTS.—Rear-Admiral William T. Tarrant, who has been Chief of Staff to Admiral F. H. Schofield as Commander-in-Chief of the Battle Fleet, will serve with the Admiral in the same capacity when he assumes command of the United States Fleet in September.

Rear-Admiral Harry E. Yarnell, from duty as Chief of the Bureau of Engineering, has been appointed to command aircraft of the United States Fleet and Carrier Division 2 of the Battle Force, in succession to Rear-Admiral Joseph M. Reeves, who has been appointed to San Francisco as senior member of the Board of Inspection and Survey, Pacific Coast.

NAVAL AIR SERVICE.

FIVE-YEAR AVIATION PROGRAMME.—The five-year aviation programme of the U.S. Navy was technically completed on 30th June, 1931. In some notes on the subject, the *Army and Navy Register*, of Washington, recalled that at the beginning of the programme, the Navy had 351 planes on hand, and there were engaged in aviation duty 670 officers and 3,877 enlisted men. At the end of the five-year plan, there would be 1,000 planes, and the naval aviation complement would consist of about 1,000 officers and 11,000 enlisted men. The five year aircraft act authorised a total of 1,614 planes to be purchased at a limit cost of 85,078,750 dollars. Congress has actually appropriated a total of 64,771,600 dollars, but a saving of 2,000,000 was made last year and returned to the Treasury. Thus the Navy has actually had the spending of 62,771,600, or 22,307,150 less than was authorised

NAVAL AIR FORCE.—Admiral Akermark, Commander-in-Chief Coastal Fleet, has presented a memorial to the Government criticising the present methods of training naval airmen. In May, 1930, he had pointed out the defects in the system of training, but the Chief of the Air Force had not replied to his complaint. In the meantime the defects referred to had manifested themselves in many ways—for instance, airmen undergoing their first period of training for co-operation with the Navy had for nine months been trained solely on land machines. They were supposed to complete their training by the end of May, and their experience with seaplanes would obviously be inadequate.

The Chief of the Air Force had now suggested that there should be a still further reduction in co-operation training, and Admiral Akermark pointed out that the whole of the training with the Coastal Fleet was liable to be compromised, and refused to accept any responsibility for the consequences.

UNITED STATES

FLEET FLAGSHIP.—It was originally intended that the new 10,000-ton cruiser "Chicago" should replace the battleship "Texas" as flagship. This policy appears to have been changed and when the present Commander-in-Chief, Admiral Jehu V. Chase, is relieved in September next by Admiral Frank H. Schofield the battleship "Pennsylvania" which has recently been modernized will relieve the "Texas."

CRUISER CHANGES.—The "Chicago" on completing her final trials has been ordered to proceed from the Pacific to the Atlantic on becoming flagship of the Cruiser Division, Scouting Force. The cruiser "Augusta" relieved the battleship "Arkansas" in May as flagship of the Scouting Force when the "Arkansas" relieved the "Wyoming" as flagship of the Training Squadron. It is intended to transfer the cruisers of the "Omaha" class from the Scouting Force to form Cruiser Division III, Battle Force, as 10,000-ton cruisers become available to take their places. The "Concord," "Omaha," "Cincinnati" and "Milwaukee" will be so transferred shortly after the 1st January, 1932.

NEW CRUISERS.—The names of "San Francisco" and "Tuscaloosa" have been selected for the new cruisers Nos. 37 and 38, which were ordered in February, 1931, and October, 1930, respectively, the former from the New York Shipbuilding Co., Camden, and the latter from the Mare Island Navy Yard. These two vessels are the last 8-inch gun 10,000-ton cruisers which the United States may lay down until 1933 under the London Naval Treaty.

NEW SUBMARINE.—Tenders were opened at the Navy Department on 19th May for the construction of the "Cuttlefish," fleet submarine, formerly known as "V.9," and the contract was awarded to the Electric Boat Company, of Groton, Conn., for 3,297,000 dollars. The vessel is due for delivery within thirty months.

The "fleet submarines" of the "V" class built since the late War have been renamed as follows:—V.1, "Barracuda"; V.2, "Bass"; V.3, "Bonita"; V.4, "Argonaut"; V.5, "Narwhal"; V.6, "Nautilus"; V.7, "Dolphin"; V.8, "Cachalot"; and V.9, "Cuttlefish."

SUBMARINE STRENGTH.—On 1st July, 1931, the beginning of the 1932 fiscal year, there were 56 submarines in commission, representing a total standard tonnage of 51,840. Forty-three submarines were out of commission at the beginning of the 1931 fiscal year; of these, the "S.51" was sold to be broken up, while seven of the "R" class, five of the "O" class of a lake type, and three of the

"T" class were scrapped during the year at Philadelphia. The "O.12" has been transferred to the Shipping Board for experimental purposes.

The remaining twenty-six submarines, consisting of eight "H" class, eight "K" class, four "L" class and three "N" class, all of which are pre-war submersibles, and three of the "S" class, will be scrapped during 1931. The scrapping of these vessels, it will be recalled, is in accordance with the plan approved by the Secretary of the Navy on the 25th November, 1929.

At the beginning of the 1932 fiscal year, the submarines out of commission will consist of eleven "R" class, five "S" class, and nine "O" class, which are being paid off as a measure of economy, a total of 14,100 tons. This group of submarines will have to be scrapped prior to December, 1936, in order that the total tonnage of submarines may be reduced to the limit fixed by the London Treaty.

THE NAVAL BASE AT GUAM.—On 7th June, it was reported in Press messages from Washington that the use of Guam as a naval base was to be given up, under a new plan which aimed at reducing expenditure by 25,000,000 dollars a year. The island of Guam, the principal unit of the Marianne or Ladrone Archipelago, was ceded by Spain to the United States under the Treaty of Paris in 1898, and has been under the jurisdiction of the Navy Department. After the late war there were ambitious plans for the development of Guam as a naval base of the first class, but under the Washington Treaty the United States agreed not to fortify it, and it has remained merely a fuelling station.

CHANGES IN HIGHER POSTS.—Rear-Admiral William T. Tarrant, who has been Chief of Staff to Admiral F. H. Schofield as Commander-in-Chief of the Battle Fleet, will serve with the Admiral in the same capacity when he assumes command of the United States Fleet in September.

Rear-Admiral Harry E. Yarnell, from duty as Chief of the Bureau of Engineering, has been appointed to command aircraft of the United States Fleet and Carrier Division 2 of the Battle Force, in succession to Rear-Admiral Joseph M. Reeves, who has been appointed to San Francisco as senior member of the Board of Inspection and Survey, Pacific Coast.

NAVAL AIR SERVICE.

FIVE-YEAR AVIATION PROGRAMME.—The five-year aviation programme of the U.S. Navy was technically completed on 30th June, 1931. In some notes on the subject, the *Army and Navy Register*, of Washington, recalled that at the beginning of the programme, the Navy had 351 planes on hand, and there were engaged in aviation duty 670 officers and 3,877 enlisted men. At the end of the five-year plan, there would be 1,000 planes, and the naval aviation complement would consist of about 1,000 officers and 11,000 enlisted men. The five year aircraft act authorised a total of 1,614 planes to be purchased at a limit cost of 85,078,750 dollars. Congress has actually appropriated a total of 64,771,600 dollars, but a saving of 2,000,000 was made last year and returned to the Treasury. Thus the Navy has actually had the spending of 62,771,600, or 22,307,150 less than was authorised

ARMY NOTES

HOME

APPOINTMENTS AND PROMOTIONS.—H.M. the King has approved of the appointment of H.H. Maharajah Sir Hari Singh, Indar Mahindar Bahadur, Sipar-i-Saltanat, Maharaja of Jammu and Kashmir, G.C.I.E., K.C.V.O., as Honorary Aide-de-Camp to the King.

H.M. the King has approved of the appointment of Colonel (temporary Brigadier) A. J. McCulloch, D.S.O., D.C.M., and Colonel H. C. Hawtrey, C.M.G., D.S.O., as Aides-de-Camp to the King; and of the undermentioned officers as Aides-de-Camp to the King (Additional):—Colonel (Honorary Brigadier-General) Sir Norman A. Orr-Ewing, Bt., D.S.O. (retired pay), (Reserve of Officers), late Lieutenant-Colonel, Territorial Army, in succession to Colonel (Honorary Brigadier-General) the Rt. Hon. The Duke of Atholl, K.T., G.C.V.O., C.B., D.S.O., T.D., Colonel Commandant, Scottish Horse Scouts; Colonel E. J. King, C.M.G., T.D., Territorial Army, Honorary Colonel, 7th Battalion, The Middlesex Regiment, Territorial Army, in succession to Colonel the Hon. A. G. Brodrick, T.D., Territorial Army; Colonel S. W. Ashwanden, D.S.O., T.D., Territorial Army, to complete establishment; Colonel J. B. McKaig, D.S.O., T.D., Territorial Army, to complete establishment; Colonel Sir F. Carne Rasch, Bt., Territorial Army (Lieutenant-Colonel, retired pay) (Reserve of Officers) (Gentleman-at-Arms), in succession to Colonel (Honorary Brigadier-General) the Viscount Hampden, K.C.B., C.M.G., retired Territorial Army (Major, retired pay); Colonel J. L. Jack, D.S.O., Territorial Army (Colonel, retired pay) (Reserve of Officers), to complete establishment; Lieutenant-Colonel T. C. Dunlop, T.D., The Ayrshire Yeomanry, Territorial Army, in succession to Colonel the Lord Lovat, K.T., K.C.M.G., K.C.V.O., C.B., D.S.O., T.D., Colonel Commandant The Lovat Scouts (Honorary Major in the Army).

H.M. the King has approved of the appointment of Major-General H. Boulton, C.B., C.B.E., M.D., Indian Medical Service (Honorary Surgeon to the Viceroy of India), as Honorary Surgeon to the King, and Colonel C. W. F. Melville, M.B., F.R.C.S. Edin., Indian Medical Service, as Honorary Physician to the King.

H.M. the King has approved of the appointment of Major-General Sir George T. Forestier-Walker, K.C.B.; Major-General Sir Arthur W. Money, K.C.B., K.B.E., C.S.I., retired pay; and Major-General Sir George McK. Franks, K.C.B., retired pay, as Colonels Commandant, Royal Artillery.

H.M. the King has approved of the appointment of Colonel A. Crookenden, D.S.O., as Colonel of The Cheshire Regiment.

The following appointments have been announced:—General Sir W. Thwaites, K.C.B., K.C.M.G., to be Director-General of the Territorial Army at The War Office, with effect from 1st October next, in succession to General Sir R. B. Stephens, K.C.B., C.M.G.; Lieutenant-General Sir W. E. Ironside, K.C.B., C.M.G., D.S.O., to be Lieutenant of the Tower of London, in succession to Lieutenant-General

Sir H. C. C. Uniacke, K.C.B., K.C.M.G.; Major-General H. Needham, C.M.G., D.S.O., to command a District (2nd Class) in India, with effect from November next; Major-General G. H. N. Jackson, C.B., C.M.G., D.S.O., to be Commander, 49th (West Riding) Division, Territorial Army, in succession to Major-General Sir R. S. May, K.B.E., C.B., C.M.G., D.S.O., appointed Commandant, Royal Military College, Sandhurst; Major-General E. S. Girdwood, C.B., C.M.G., to be General Officer Commanding, Northern Ireland District, in succession to Major-General A. G. Wauchope, C.B., C.M.G., C.I.E., D.S.O.; Major-General H. Karslake, C.B., C.M.G., D.S.O., to be Major-General, Royal Artillery, Army Headquarters, India, in succession to Major-General J. E. S. Brind, C.B., C.M.G., D.S.O., who has been appointed Deputy Chief of the General Staff, Army Headquarters, India, in succession to Major-General S. F. Muspratt, C.B., C.S.I., C.I.E., D.S.O., Indian Army; Major-General G. W. Howard, C.M.G., D.S.O., to be Major-General in charge of Administration, Eastern Command, in succession to Major-General C. G. Fuller, C.B., C.M.G., D.S.O., appointed Commander, 48th (South Midland) Division, Territorial Army; Major-General E. T. Humphreys, C.B., C.M.G., D.S.O., to be Commander of the 5th Division, in succession to Major-General W. M. St. G. Kirke, C.B., C.M.G., D.S.O.

The following Promotions have been made :—

Lieutenant-General Sir William Thwaites, K.C.B., K.C.M.G., Colonel Commandant R.A., to be General.

Major-General J. R. E. Charles, C.B., C.M.G., D.S.O.; Major-General J. W. O'Dowda, C.B., C.S.I., C.M.G., Colonel, The Royal West Kent Regiment; Major-General A. G. Wauchope, C.B., C.M.G., C.I.E., D.S.O.; Major-General Sir W. M. Thomson, K.C.M.G., C.B., M.C., to be Lieutenant-Generals.

Colonel J. Kennedy, C.M.G., D.S.O.; Colonel M. Taylor, C.M.G., D.S.O.; Colonel Sir J. Burnett of Leys, Bt., C.M.G., D.S.O.; Colonel H. F. Salt, C.M.G., D.S.O.; Colonel B. D. Fisher, C.B., C.M.G., D.S.O.; Colonel A. Brough, C.M.G., O.B.E., D.S.O., to be Major-Generals.

PRESENTATION OF A PORTRAIT OF H.I.M. THE EMPEROR OF JAPAN TO THE STAFF COLLEGE, CAMBERLEY.—The Secretary of State for War, on 21st May, received from H.E. the Japanese Ambassador an autographed portrait of the Emperor of Japan presented by H.I.M. to the Staff College at Camberley, where it will be added to the portraits of other Field-Marsals of the British Army in a special gallery at the College. The ceremony took place at the Army and Navy Club.

After the presentation, Mr. Shaw entertained H. E., the Japanese Ambassador at lunch. The following were also invited :—Colonel M. Homma (Japanese Military Attaché), Major E. Tatsumi (Assistant Japanese Military Attaché), The Rt. Hon. Sir John Tilley (lately His Majesty's Ambassador at Tokyo), The Rt. Hon. Sir Francis Lindley (His Majesty's Ambassador designate at Tokyo), Sir Robert Vansittart, Sir Victor Wellesley, Field-Marshal Sir George Milne, Sir Herbert Creedy, Major-Generals W. H. Bartholomew, C. Bonham-Carter, Sir Hugh Elles, J. G. Dill (Commandant Staff College); Brigadiers A. C. Temperley and E. S. G. Piggott; Colonels H. M. Wilson, E. K. Squires, A. C. Dawnay; Majors J. G. des R. Swayne, E. G. Miles, Mr. H. J. B. Clough and Mr. A. J. Newling.

After lunch speeches appropriate to the ceremony were delivered by H.E. the Japanese Ambassador, the Rt. Hon. The Secretary of State for War, and the Commandant of the Staff College.

RANK ON RETIREMENT.—The grant to an officer of higher rank on retirement under the terms of Army Order 376 of 1918 may be withheld until he has ceased to be liable to recall to Army Service under Article 538, Pay Warrant, 1931.

ARMY RECRUITING.—The number of recruits obtained for the Regular Army during the financial year ending 31st March, 1931, was 31,628, which compares with 26,238 obtained during the previous year.

During the past year the following Corps and Regiments obtained the quota of recruits necessary to maintain their establishments:—Household Cavalry, Cavalry of the Line, Royal Engineers, Royal Corps of Signals, Brigade of Guards, Royal Tank Corps, Royal Army Service Corps (Transport).

During the past two months, it has been necessary to place restrictions on the intake of recruits for many arms of the Service other than the Infantry, in order to ensure that the authorised establishments should not be exceeded. These restrictions have been removed since 1st April, when all arms commenced recruiting for the requirements for the ensuing year, and unrestricted recruiting for all branches of the Army is now proceeding.

There has been a marked improvement in the number of recruits during the past six months, especially for the Infantry of the Line. If this improvement is continued, the deficiency which exists in this branch of the Army will be materially reduced.

VOLUNTARY AID DETACHMENTS.—The latest returns of Voluntary Aid Detachments, show that 104 Men's and 889 Women's Detachments, comprising a total membership of 25,119, have received recognition by the War Office. This is the first time since the inauguration of the present scheme that the membership has exceeded 25,000, and during the past six months there has been an increase of 10 detachments and 443 members. Of the present membership, 5,298 have taken the "mobile" obligation—an increase of 292 during the last six months.

The County areas in England, which have a total membership of 500 or over, are as follows:—Norfolk, 1,718; East Lancashire, 1,435; County of London, 1,422; Yorkshire (West Riding), 948; Devonshire, 889; Hampshire, 867; Yorkshire (North Riding), 778; Somerset, 745; West Lancashire, 737; Surrey, 707; Sussex, 647; Essex, 617; Cheshire, 616; Nottinghamshire, 581; Kent, 546; Lincolnshire, 537. In Scotland there are 143 Detachments, with a total membership of 3,768, of whom 1,011 are "mobile" members. There are 53 Detachments in Wales, the total membership being 1,412, of whom 252 are "mobile" members.

The present scheme for Voluntary Aid Detachments was inaugurated in 1923 and is designed to supplement the medical services of the Naval, Military and Air Forces in time of war. "Mobile" members are required to give an undertaking that, in the event of the embodiment of the Territorial Army, they are prepared to serve with the medical services either at home or abroad. "Immobile" members undertake to serve within reach of their own homes.

TERRITORIAL ARMY

STRENGTH.—The latest returns show that the total strength of the Territorial Army, exclusive of permanent staff, is now 6,599 officers and 130,745 other ranks. This is an increase of 1,913 other ranks compared with the number last month and 2,857 more than a year ago. The number of officers is 84 less than on 1st May, 1930.

In April, 4,016 recruits were finally approved for service in the Territorial Army, an increase of 205 compared with the number approved in March last, and 493 more than in April, 1930. The largest number of enlistments during the month was in the Western Command, where 1,065 recruits were finally approved, and the numbers for the other Commands were: Northern Command, 919; Scottish Command, 850; Eastern Command, 450; London District, 370; and Southern Command, 362.

DOMINION FORCES

THE KING'S MEDAL.—1. The medal with clasp "1930" for the champion shots of the undermentioned military forces has been won by the following:—

- (a) Military Forces in India.—Jemadar Yakoo Ali, The Hazara Pioneers.
- (b) Military Forces of the Union of South Africa.—Captain H. A. Viljoen, Philippolis Commando.
- (c) Military Forces of Australia.—Warrant Officer, Class I, W. H. Hackfath, D.C.M., Australian Instructional Corps.

2. The clasp "1930" for the champion shot of the Military Forces of Canada has been won by Lieutenant D. T. Burke, The Governor-General's Foot Guards, this medal was won by this officer in 1925 and the clasp in 1927 and 1929.

REGIMENTAL ALLIANCES.—H.M. the King has approved of the following alliances:—

- 19th Field Battery, Canadian Artillery, Non-Permanent Active Militia of Canada, to the 19th Field Battery, Royal Artillery;
- The Cape Breton Highlanders, Non-Permanent Active Militia of Canada, to The Cheshire Regiment;
- The Prince Edward Island Highlanders, Non-Permanent Active Militia of Canada, to The Black Watch (Royal Highlanders);
- 29th Battalion, Australian Infantry, Australian Military Forces, to The Worcestershire Regiment.
- 36th Battalion, Australian Infantry, Australian Military Forces, to The Worcestershire Regiment.

FOREIGN

FRANCE

CHANGES IN THE HIGHER COMMAND.—Marshal Pétain has been appointed Inspector-General of the French National Air Defence.

The post to be filled by Marshal Pétain implies the creation of an entirely new appointment. His duties will primarily be those of the co-ordination of all the services required to co-operate in the defence against air attack, which under modern conditions implies the protection of the whole of the French population and territory.

Marshal Pétain has been replaced by General Weygand as Vice-President of the *Conseil Supérieur de la Guerre* and Inspector-General of the Army.

General Gamelin has been appointed Chief of the General Staff in place of General Weygand, and automatically becomes a member of the *Conseil Supérieur de la Guerre*.

MANŒUVRES, 1931.—(a) The French Army manœuvres for 1931 will take place, 10th to 16th September, in the region Rheims—Laon—Rethel, and will be carried out by the 3rd, 9th and 12th Divisions under the orders of General Claudel, Member of the *Conseil Supérieur de la Guerre*.

(b) British Officers may be authorized to attend the following Divisional manœuvres :—

Coëtquidan (Ille et Vilaine).—1st Cavalry Division, 23rd August–5th September. 21st Infantry Division, 15th–28th September.

Courtine (Creuse).—15th Infantry Division, 1st–20th July.

Sissonne (Aisne).—1st Infantry Division, 23rd July–14th August.

Mourmelon (Marne).—10th Infantry Division, 3rd–23rd August.

Mailly (Aube).—42nd Infantry Division, 8th–15th August.

FRENCH MOROCCO.

General.—According to official French military opinion, their position in the northern sector of the dissident area has been stabilized very satisfactorily, and the pacification of the Tafilalet area is being gradually assured. It is considered, however, that under the present policy of peaceful penetration it will take a long time to "clean up" the Middle Atlas, though this area does not now contain more than some 30,000 dissidents.

Tafilalet area.—On 28th February, General Giraud's forces occupied the Taouz oasis on the edge of the Hammada area. There was no opposition. This success gives the French command of the most important watering-places used by the raiders on the Algero-Moroccan frontier.

Tadla area.—On 9th March, a surprise attack by the French on the Tassemitt and Tizi-Noughni heights near Beni-Bellal was successful, and resulted in the submission of an important fraction of the Ait-Said-on-Ali tribe and the establishment of communication between the northern Ogra position and the Sgatt position in the south.

Progress has been made in negotiations with the Ait Atta, a tribe comprising a large number of warring elements, which occupies an extensive territory.

Southern Morocco.—South of the Anti-Atlas a military post is to be established at Tatta. On 22nd March a reconnaissance in force met with a friendly reception at Alougoum and Foum-Zguid on the northern confines of the Bani district. The administration of the whole Agadir district, which is still under military control, is brought a step nearer the normal civil system by a Residential Decree providing for political officers at Tiznit, Iherm (Igherm) and Tatta.

The main and difficult problem of the pacification of the mountainous country behind Tadla has been still further assured by the occupation on 10th March of two mountain districts—Djebel Tassenit and Tizi Oughmi.

South of the Atlas and nearer the Algerian border, marauders from Tafilalet made an unsuccessful attack on an outlying detachment near Erfoud on 22nd March, and on 29th March a post was established south-east of Erfoud, at El Haroun, which assures communications between Taouz and Erfoud, and makes it easier to protect the nomad tribes between the Hammada and the Ziz.

PERSIA

TRANSFER OF TELEGRAPH LINES IN PERSIA.—On 28th February, the Indo-European Telegraph Department of the India Office and its telegraph company

handed over their land lines in Persia to the Persian Government after more than sixty years service in the country.

The development of wireless communications between Great Britain and India, Iraq, etc., has now deprived the Persian land lines of much of their international importance, and wireless has placed them as an alternative to the cable system in the Persian Gulf. The relinquishment of these lines is also satisfactory to the Nationalist spirit in Persia, as the Persian Government wish to own and work all telegraph lines in their own country.

UNITED STATES

WAR DEPARTMENT APPROPRIATION BILL FOR THE FISCAL YEAR 1ST JULY, 1931, TO 30TH JUNE, 1932.

(1) *Summary of Appropriations.*—The War Department Appropriation Bill for 1931-32, after consideration by both Houses of Congress, received the President's signature on 23rd February.

The following is a summary of the final appropriations in approximate sterling equivalent as compared with those for the current year :—

	1930-31	1931-32	Increase or decrease
	£	£	£
Military expenditure	70,750,000	69,750,000	— 1,000,000
Non-military expenditure . . .	22,250,000	23,250,000	+ 1,000,000
Total	£93,000,000	£93,000,000	Nil

(2) *Budget establishments.*—The Bill makes provision for the same establishments as in previous years for the Regular Army, National Guard and Organized Reserves.

(3) *Principal increases and decreases.*—Apart from the savings due to lower commodity prices, there is a decrease for the first time for nine years in the Army Air Corps vote. The money available for the execution of the much needed scheme of barrack improvements is about £2,000,000 more than in 1930-31. Since 1927 new construction to a cost of over £15,000,000 has been authorized.

(4) *Mechanization.*—No provision is made for building up a mechanized force, a purpose for which the current year's appropriations include £50,000. A mechanized force has in fact been organized on experimental lines at Fort Eustis, and Congress has provided under various items in the Budget money for mechanized equipment and its development, but the War Department wishes to allow time for thorough service tests on the material available before adopting a definite programme for the creation of a permanent force of this nature.

(5) *Non-military expenditure.*—This vote is mainly for work on river control and harbour development under the Corps of Engineers, and is of a nature not usually associated with a country's war Budget. The rise in this year's appropriation is probably connected with the general policy of increased activity on public works to alleviate unemployment.

AIR NOTES

ROYAL AIR FORCE

APPOINTMENTS.

AIR MARSHALS.—Sir Edward L. Ellington, K.C.B., C.M.G., C.B.E., to be Air Member for Personnel on the Air Council, to date September, 1931; Sir W. G. H. Salmond, K.C.B., K.C.M.G., D.S.O., to be Air Officer Commanding-in-Chief, Air Defence of Great Britain, to date September, 1931.

AIR VICE-MARSHALS.—T. I. Webb-Bowen, C.B., C.M.G., to be Air Officer Commanding, Wessex Bombing Area, Air Defence of Great Britain, to date September, 1931; R. H. Clark-Hall, C.M.G., D.S.O., to be Air Officer Commanding, Coastal Area, to date 1st October, 1931; C. L. N. Newall, C.B., C.M.G., C.B.E., A.M., to be Air Officer Commanding, Royal Air Force, Middle East, to date 12th October, 1931.

AIR COMMODORES.—N. D. K. MacEwen, C.M.G., D.S.O., to be Air Officer Commanding, Royal Air Force, Halton, to date 1st October, 1931; A. W. Bigsworth, C.M.G., D.S.O., A.F.C., to be Director of Equipment at the Air Ministry, to date 1st October, 1931; R. C. M. Pink, C.B.E., to Headquarters, Air Defence of Great Britain, Uxbridge, pending appointment as Senior Air Staff Officer; A. G. Board, C.M.G., D.S.O., to Headquarters, Royal Air Force, India; R. P. Mills, C.B., M.C., to be Director of Organization and Staff Duties, Air Ministry, to date 1st August, 1931.

AIR AIDE-DE-CAMP TO THE KING.—Group Captain F. K. Haskins, D.S.C., has been appointed Air Aide-de-Camp to the King.

PROMOTIONS.

GENERAL DUTIES BRANCH.—The following promotions have been made with effect from the 1st July, 1931:—

Air Commodores F. W. Bowhill, C.M.G., D.S.O., and C. S. Burnett, C.B., C.B.E., D.S.O., to be Air Vice-Marshals.

Group Captains C. T. Maclean, D.S.O., M.C., E. D. M. Robertson, D.F.C., A.D.C., R. C. M. Pink, C.B.E., H. M. Cave-Brown-Cave, D.S.O., D.F.C., and H. Le M. Brock, D.S.O., to be Air Commodores.

Wing Commanders W. C. Hicks, A.F.C., The Hon. L. J. E. Twistleton-Wykeham-Fiennes, J. C. Quinnell, D.F.C., A. D. Walser, M.C., D.F.C., S. W. Smith, O.B.E., L. D. D. McKean, O.B.E., F. L. Robinson, D.S.O., M.C., D.F.C., C. F. A. Portal, D.S.O., M.C., and J. S. T. Bradley, O.B.E., to be Group Captains.

MEDICAL BRANCH.—Air Commodore J. McIntyre, M.C., M.B., B.Ch., to be Air Vice-Marshal.

AIR EXERCISES.

The Command Exercises for 1931 were carried out between 20th and 23rd July. The exercises were designed :—

- (a) To allow the Air Officer Commander-in-Chief, Air Defence of Great Britain to test the operational efficiency of his Command.
- (b) To exercise the Air Defence Formations Territorial Army, and the Observer Corps.

(Note.—A special article on these Air Exercises will appear in the November number of the JOURNAL.)

PERSONNEL.

PASSING-OUT REPORT ON CRANWELL CADETS.—In his report at the passing-out inspection of Flight Cadets in July, the Commandant of the R.A.F. College, Cranwell, included the following remarks :—

The present strength of the College is 126 as compared with 118 in July last. The present Fourth Term, now passing out, numbers 30 Cadets.

Cadets going to fighter Squadrons have all qualified on Siskins and the remainder on the Atlas. In addition all those Cadets who may be called upon shortly to fly the high performance modern day bomber have been given some experience on the Fairey Fox aeroplanes of that type which have recently been added to the strength of the College. All Cadets passing out have completed at least 20 hours' solo flying on their selected Service type and, in many cases, very much more. The average flying on all types throughout the course for this Term works out at 107 hours.

Each of the three Cadet Squadrons was represented by two Cadets in the R. M. Groves Memorial Flying Competition, and for the second time in succession the prize was won on an Atlas.

During the term it has been necessary for five British Flight Cadets to be withdrawn from training on account of their inability to learn to fly. Each of these Cadets was given the most careful consideration, tested and re-tested, and ultimately after varying periods, assessed finally as unsuitable. The proportion of the Cranwell entry who ultimately prove unfit for training as pilots is very small, perhaps 3 per cent., but there is always this possibility to be faced.

Parents of candidates for the Cranwell entry would be well advised to arrange for their sons to have a little flying at a flying school or club to see how they take to the air and to the controls before entering them as Flight Cadets.

Good progress has been made during this year in the erection of the new College buildings. Under present policy it may be hoped that these will be completed during 1932 and ready for occupation in the following year.

UNIVERSITY AIR SQUADRONS.—The annual attachment of the Cambridge University Air Squadron for 1931 took place at the School of Army Co-operation, Old Sarum, from 14th June to 25th July.

The Oxford University Air Squadron was attached to the Armament and Gunnery School, Eastchurch, from 21st June to 1st August.

ATTACHMENT OF FOREIGN OFFICERS.—During the current year a number of foreign officers are being attached to the Royal Air Force for short course. These include two each from Chile, Portugal and Yugo-Slavia.

R.A.F. DISPLAY.

The annual R.A.F. Display was held at Hendon on 27th June.

Included in the Events was a demonstration of launching a heavy aircraft by a land catapult. The catapult was designed and built at the Royal Aircraft Establishment, Farnborough. It is operated by a 4,000 H.P. compressed air equipment, and by it a 7-ton aeroplane can be launched in a run of 40 yards, by which time it has attained a speed of 60 miles per hour.

ORGANIZATION.

No. 210 (Flying Boat) Squadron, formed at Felixstowe on 1st March last, moved to Pembroke Dock on 15th June where it will remain until 30th September.

No. 10 (Bomber) Squadron moved from Upper Heyford to Boscombe Down on 1st April, 1931. This move completed the establishment of Boscombe Down as a night bomber station.

The "night-flying flight," Biggin Hill, has been renamed "Anti-aircraft Co-operation Flight," as it was considered that the previous title was inappropriate to the duties performed by the unit.

Headquarters, Royal Air Force, India, moved from New Delhi to Simla on 1st April, 1931.

SEAPLANES' MEDITERRANEAN CRUISE.

A cruise of the Mediterranean, the first R.A.F. cruise based on Malta, was begun on 14th July by No. 202 (Flying Boat) Squadron, using Fairey III F. Seaplanes with which the squadron is temporarily equipped.

The aircraft proceeded on the first day to Corfu and on the 15th to Athens. On the following day the flight was continued to Aboukir with an intermediary landing at Mirabella (Crete). Six days were spent at the Egyptian station and on 22nd July the return journey was started. The aircraft flew to Sollum and next day returned to Athens via Mirabella.

ARMY CO-OPERATION.

During May an Army Co-operation Wing exercise was held by No. 22 Group Headquarters. A Wing Headquarters was formed for the purpose of the exercise and three Army Co-operation Squadrons participated. Some valuable lessons were learned.

During May and June, artillery co-operation at the R.A. Practice Camps at Larkhill, Westdown, Okehampton, Redesdale, and Budden, was carried out by detachments from the Army Co-operation Squadrons. No. 26 Army Co-operation Squadron maintained a flight in Scotland for part of May and for the whole of July. The 28th R.A.F. Officers Course was held from 4th May to 25th July at the School of Army Co-operation, Old Sarum. The Coast Defence Flight moved temporarily from Eastchurch to Plymouth and carried out air observation for the coast defences there from 5th June to 17th July.

IRAQ

OPERATIONS AGAINST SHEIKH MAHMOUD.—Further details are now available concerning the operations against the Kurdish outlaw, Sheikh Mahmoud, reported in last quarter's JOURNAL.

Following an attack by his rebel forces on a convoy of Public Works Department vehicles, reconnoitring aircraft were heavily fired upon on 6th March in the area South East of Sulaimania. The aircraft, though damaged by the rebel fire, retaliated and dispersed the enemy. As a result of air reconnaissance it was later established that the rebels had reached the Qara Dagh Valley where they were again subjected to air action. In order to harass Sheikh Mahmoud and, by guarding all the known passes out of the valley, force him to surrender, a mobile force consisting of Iraq Police and Cavalry was formed. Supply dumps were established at convenient points throughout the area and two flights of No. 55 (B) Squadron and No. 3 Armoured Car Section were based on Sulaimania to work in co-operation with the ground troops. On several occasions parties of rebels were observed by the aircraft, and the gullies and villages in which they were sheltering were subjected to air action.

In spite of the measures taken to suppress Sheikh Mahmoud's activities against the Government there appeared a grave danger of the disaffection spreading into the Shaikham area, where a party of rebels, probably numbering three hundred, under the leadership of Sheikh Osman Beg, made a serious attack on the police post at Beluli. In view of the absence of troops and the danger of demoralization of the police, who were showing signs of surrendering, air action was taken on 28th March, after due warning had been given, against the rebels sheltering in the villages of Shawazi, Kani Kermani and Bagh Anarau. On the following day Sheikh Osman Beg was ordered to surrender. As he had not complied within the specified time his village of Hurin was subjected to air action on 30th March. The action taken was effective in arresting the spread of disaffection, and the police, whose morale prior to the action of the aircraft was weakening rapidly, regained control of the situation.

Further information regarding the location of the rebels was obtained by air reconnaissances and as a result the mobile force gained touch with them on 5th April at Awa Barika. After a short action the rebels evacuated the village under cover of darkness and retiring north eastwards, eventually took refuge in the cave area around Dola Gelel. Owing to the nature of the country the ground troops experienced great difficulty in regaining touch with the rebels, but the aircraft, now reinforced by one flight of No. 70 (B.T.) Squadron and one flight of No. 84 (B) Squadron maintained a continual pressure on Sheikh Mahmoud's forces with the result that he retired across the frontier into Persia. Iraq Army columns pursued him as far as the frontier, and re-established Government authority in the area. In order to prevent Sheikh Mahmoud from using Persian territory as a safe refuge, a course which he previously adopted when hard pressed in Iraq, the Persian Government was asked to co-operate against him, and agreed to do so in return for assistance in the capture of Mahmoud Khan Dizli, a Persian refugee in Iraq. This agreement was reached on 5th May, and combined operations were planned to begin on 16th May, an ultimatum being despatched in the meanwhile to Sheikh Mahmoud demanding his immediate surrender on the condition that his life would be spared. At the expiration of the time limit given in the ultimatum he surrendered at Pendsjwin, and was conveyed by air to Ur where he now is, pending the completion of arrangements for the ultimate accommodation of himself and his family at a place to be selected by the Iraq Government.

FLIGHT OF IRAQ AIRCRAFT FROM ENGLAND TO BAGHDAD.—The first flight of the newly formed Iraq Air Force left England for Baghdad on 8th April. The flight consisted of 5 D.H. Moth aircraft piloted by officers of the Iraq Air Force who

have recently completed their flying training in England, and one Puss Moth aircraft piloted by Flight Lieutenant Carter, R.A.F., attached to the Iraq Air Force. The flight, which was commanded by Flight Lieutenant Carter, proceeded by way of Paris, Marseilles, Milan, Belgrade, Constantinople, Aleppo and Ramadi, and arrived at Baghdad, its new home, on 22nd April, without incident.

SUDAN

For many years past the Turkana country in Northern Kenya has been subject to raids by parties of Abyssinian tribesmen, who, in order to reach Kenya Territory, have crossed the south eastern corner of the Sudan. As a result of representations from the Government of Kenya the Sudan Government, in order to put a stop to further raiding, decided to explore the possibilities of occupying that portion of the Mongalla Province as far as the Abyssinian boundary known as the Ilemi Triangle. A reconnaissance by a patrol of the Equatorial Corps working in co-operation with a flight of No. 47 (B) Squadron based on Kapoeta was accordingly undertaken in January.

The objects in view were the establishment of a car route from Kapoeta to the Kaiserin and Lorient mountains, the selection of sites for landing grounds along the route and the collation of general information about the country. The aircraft searched ahead of the ground patrol for the best possible route, reporting progress meanwhile. Water was located and in places where no water could be found supplies were dropped by parachute. A thorough reconnaissance of the whole of the Ilemi Triangle was made and a number of sites for landing grounds were selected, on several of which the aircraft were able to land after a small amount of clearance by the ground party had been made. The maps in use were found to be extremely inaccurate, but the information obtained from air reconnaissance has enabled a new sketch map to be prepared. The stores, W/T ground station, aircraft spares, tools, food and all additional stores required for a stay of six weeks at Kapoeta were conveyed from Khartoum, a distance of 700 miles, by two Victoria aircraft of No. 216 (B.T.) Squadron (Cairo).

TRANSJORDAN

On 30th March, four policemen belonging to an Arab Legion patrol were attacked by a party of camelmen of the Nejd Shararat tribe while drawing water at Tubeiq. The raiders, after killing three of the policemen and wounding the other, made off with their camels and rifles and although pursued by the remainder of the patrol, succeeded in making good their escape into Nejd territory. The patrol formed part of the newly constituted force of police organised for the purpose of combating trans-frontier raiding between Transjordan and Nejd tribes.

ITALY

NIGHT BOMBING AIRCRAFT.—The problem of the provision of a satisfactory type of night bombing aircraft has occupied the attention of the Italian Air Ministry for some considerable time, and several experimental types have been produced. Of these the Caproni Ca.74 and Ca.101 have proved the most satisfactory.

The Ca.74 is a biplane fitted with two 510 h.p. Isotta engines, it has a speed of 106 m.p.h. at 13,000 feet, and carries 2,200 lbs. of bombs.

The Ca.101 is an all metal monoplane fitted with three 250 h.p. Asso engines, it has a speed of 130 m.p.h. at sea level, and has a total useful load of 3,300 lbs.

NEW EXPERIMENTAL AND RESEARCH CENTRE, MONTECELIO.—A new experimental and research centre is to be built at Montecelio aerodrome, near Rome, and when completed this establishment will replace the existing one in Rome. A total amount of 30 million lire is allotted for the construction of the centre, spread over a period of four years, and the building is due to be completed by 1934.

NETHERLANDS

EAST INDIES MILITARY AIR SERVICE.—The headquarters of the Dutch East Indies Military Air Service and the three squadrons of aircraft, which comprise the fighting forces of the Air Arm, are established at Andir, near Bandoeng, together with various auxiliary services. The flying school is at Kalijati, N.W. of Bandoeng.

The three squadrons are equipped respectively with Fokker D.C.I. aeroplanes, Curtiss Hawk fighters, and Fokker C.V. aeroplanes. Avro school aeroplanes and D.H.9s, are used at the flying school. Including reserve machines and various aeroplanes used for special purposes (transport, ambulance), a total of over eighty aircraft are available.

The Military Air Service has under it ten branches; armaments section, parachute section, observers' school, W/T. Service, photo-technical service, carrier pigeon service, technical service, medical service, transport and stores service.

SOVIET UNION

AIRCRAFT INDUSTRY AND AIR FORCE STRENGTH AND EFFICIENCY.—The following summarized extracts from an article in the German Press are particularly interesting in view of their reference to statements made by Baranov, head of the Red Air Force, and by one of the Air Force commanders who took part in the 1930 manoeuvres.

"The various reports on Russia's military strength are very conflicting. The fine performances put up by Russian military airmen have, however, often been acknowledged—amongst others by the Italian Air Minister, General Balbo, who visited Odessa in 1929 with an Italian Wing, where he met Baranov. The Czecho-Slovakian Press now reports that Baranov has published some information on the Red Air Force in the 'Russki Invalid.' From this and other sources of information it is gathered that the aircraft industry, practically non-existent before the War, turned out 1,769 aircraft and 660 aero-engines during 1916. According to Baranov, output fell to 137 aircraft and 77 engines in 1919 and fell to nothing in 1920. In 1922, the output was 43 aircraft and only 8 engines. Subsequently, a factory for the construction of Junkers aircraft was established near Moscow and aircraft were also purchased from Great Britain, Italy and Holland. It was not until 1925 that Russia began to construct, in quantity, the 'R.I. M.5' (i.e., Russian built copy of the 'D.H.9.A.' with 400 h.p. Liberty engine). In 1926, the construction of all metal aircraft was begun. In 1929, aluminium (which had hitherto been imported from Germany) was produced in Russia.

The Tsagi (Central Aero-Hydrodynamical Institute) was established and more than a dozen aviation schools were opened. Six of these schools were *ad initio* flying training schools, one was an air armament school (for fighter and bomber personnel) and the others were observers' or mechanics' schools. The highest

grade school, which ranks with the General Staff Academy of the Army, is the Military Air Academy, where special courses are held for senior Air Force personnel.

The number of military aircraft in Russia, at present, is rather over a thousand—not including training aircraft. Russia is one of the chief air powers of Europe and has more aircraft than all her European neighbours together.

The Russian aircraft industry can now cope with peace-time requirements and Russia is reserving large supplies of all-metal aircraft, engines, semi-manufactured goods and raw material for war purposes.

All the air forces are under the People's Commissar for War. Hence, as in Italy, the land, sea and air forces are under one command. Military Aviation comes under the Chief Directorate of Air Forces and all military districts and the various Seas have their own air commanders and administrations. The tactical unit is the flight of eight to twelve aircraft. Three flights form a squadron. The biggest formation is the Air Brigade, of which there are twenty in Russia at present.

The following criticism of the 1930 air manoeuvres by one of the Red Air Force commanders is noteworthy. He praised the courage of the pilots, their skill in flying, the wonderful improvement in carrying out flights by night, in fog, rain, thick cloud, stormy weather, etc. Excellent results were obtained in firing at targets on the ground and in the air. The service for maintenance of material has improved, resulting in far fewer forced landings and accidents. The meteorological service has improved. The following short-comings were noticeable: Landings within a restricted area with obstacles left much to be desired, there were also errors in orientation, piloting by means of instruments, bomb dropping from high and medium altitudes. Many errors were observed in wireless telegraphy, reading of pilots' signals and air photography. The co-operation between land and air forces is not yet satisfactory. Probably as a result of the experience gained during these manoeuvres, the new training regulations stipulate that all manoeuvres of land troops from battalions upwards must be carried out whenever possible, in co-operation with air forces."

AIR FORCE TRAINING.—The Russian Press has recently contained several articles stressing the importance of the 1931 training season for the Red Air Force. According to these articles, units are to receive "specialised training according to types" and will no longer be trained as general purpose units. Annual training is divided into two periods, namely (1) the winter period, lasting three months from 15th December to 15th March (in Northern Districts up to 1st April); (2) the summer period, lasting five months from 15th May to 15th October. Four months in the year are thus taken up by spring and autumn intervals, when aerodrome surfaces are at their worst and air work has to be reduced accordingly. During these periods, personnel proceed on leave.

The instructions lay down six hours daily work for flying personnel and eight hours for technical personnel. Headquarters must keep the same hours as their units. One hour daily is to be devoted to "cultural and educational work." Flying personnel are to have "seven hours guaranteed uninterrupted sleep." Special attention is to be given to the improving of the technical and tactical qualifications of commanders. With the object of raising the standard of discipline, two hours every ten days are to be devoted to special drill.

A curious aid to efficiency in air units is the "skvoznaia brigada." The Communist Party "cell" of a unit secretly appoints several members of the unit (e.g., one pilot, one observer, one fitter and one rigger) to keep a secret watch

on the work carried out by their comrades during the day. In the evening, after receiving their reports, the Party "cell" compiles a summary of all defects discovered and displays it publicly in the unit. The names of the informers are not disclosed. The efficiency of one unit, which did particularly well during the 1930 summer training season, was attributed largely to the work of the "skvozniaia brigada."

FIGHTER FORMATIONS.—In the Soviet Russian monthly publication "Journal of the Air Fleet," there is an article by an Air Force pilot on air observation by a fighter formation. The basic formation in Russia is the "zveno"—or "detachment" of three aircraft. The writer says that a group of fighters in close formation makes use of only one pair of eyes—namely, those of the lead. The other pilots cannot search the sky as their eyes must be kept almost entirely on their leader. The article suggests that a fourth fighter should be added, and that its pilot should fly behind the other three aircraft. This pilot, as well as the leader, would be responsible for keeping watch and he would be allowed to "stand off" a little from the formation while he was looking round. The writer claims that this scheme was tried in one unit and that it gave good results in the locating of "enemy" aircraft.

Development was transferred from Cardington to the Air Ministry on 1st July 1931.

AIRSHIP NOTES

GREAT BRITAIN

FUTURE POLICY.

The latest airship policy adopted by the Government was announced by the Prime Minister in the House of Commons on the 14th May. In the course of his speech the Prime Minister stated that airships up to date have neither proved a failure nor achieved an assured success. He also outlined the policy of other countries in regard to airship construction and experiment.

Dealing with the possible alternatives which this country might adopt, the Prime Minister stated that three courses were open. The first was to undertake the construction of further airships in a manner similar to the 1924/1930 programme; this he definitely rejected. The second alternative was to destroy or to dispose of the "R.100," dispersing the majority of the personnel, and to sell or turn to other uses the airship bases and their equipment, keeping only in being a secretariat for recording information acquired from foreign experience. The third course, which he described as the maintenance of a scientific experimental interest in airship development and airship problems, involves the re-conditioning of "R.100," the flying of the airship for training and experimental purposes while abandoning any idea of long distance spectacular flights, and the retention of the airship bases and a nucleus constructional and operating staff.

The Government had decided to adopt the third course, the cost of which was estimated at £120,000 for the first year, £130,000 for the second year, with a peak figure of £140,000. The programme would be reviewed in any case in three or four years time, and might in the meantime be curtailed or expanded if any development should occur which defined the future of airships with more certainty. During the course of the debate it was announced that the programme was based on the use of hydrogen as the lifting medium for the airship.

DIRECTORATE OF AIRSHIP DEVELOPMENT.—The Directorate of Airship Development was transferred from Cardington to the Air Ministry on 1st July, 1931.

Group Captain W. C. Hicks, A.F.C., has been appointed Director of Airship Development with effect from that date, and will be responsible, under the Air Member of Council for Supply and Research, for all airship matters including development, experiment and research (the last named in co-operation with the Director of Scientific Research) and for the administration of the Royal Airship Works and other airship bases. He will also be responsible for the development of kite balloons.

The Royal Airship Works, Cardington, which will be in charge of a Superintendent, will be an out-station establishment coming directly under the Director of Airship Development, Air Ministry. Squadron Leader S. Nixon, O.B.E., Dr. H. R. Cox, B.Sc., Ph.D., A.F.R.Ae.S., and Squadron Leader R. S. Booth, A.F.C., commanding "R.100," have been appointed respectively Superintendent, Chief Technical Officer, and Officer in Charge of Flying and Flying Training at the Royal Airship Works.

GERMANY

POLAR FLIGHT.—Another remarkable flight by the "Graf Zeppelin" terminated with the airship's return to Friedrichshafen on 31st July. Just a week previously she had set out on a voyage of discovery over the North Polar regions.

Scientific and geographical observations of great importance are reported to have been accomplished, including a survey of hitherto unknown territory lying between latitude 82° N. and 75° N. A new mountain range, the height of which was estimated at 4,500 feet and width 20 miles in the Tainyr peninsula, was another discovery.

The "Graf Zeppelin" carried two small observation balloons fitted with automatic wireless, with which meteorological data were obtained up to a height of ten miles above the sea level.

JAPAN

The naval dirigible of the 15-9 type designed and built in Japan with Japanese material has carried out an endurance flight of thirty hours and fifty minutes, after which it returned to the hangar at Osaka.

This is a Japanese record for endurance.

UNITED STATES

METAL-CLAD AIRSHIP DEVELOPMENT.—According to the *Army and Navy Register* of Washington, continued pressure on the members of Congress by the Airship Development Corporation, who proposed that a large metal-clad airship, of 100 tons gross lift should be constructed for the Army Air Corps, has resulted in orders to the Navy Department to collaborate with the Company in the initial research work, and for this purpose a sum of \$75,000 has been appropriated. No decision, however, as to the ultimate construction of such a dirigible has yet been reached.

NAVAL

Official History of the War. Naval Operations. Vol. V. New York: (Longmans, Green & Co.) 315 pp. 1918. 10s. 6d. This latest volume of the series, which is in some respects the most interesting of the series, deals with clearing the seas of enemy submarines, the strategy of the Falklands, the ill-fated attempt against the Harbinger, the battle of Iceland, with naval operations in the North Atlantic, and the operations in the North Sea. The volume is a most valuable addition to the series, and is a most interesting read. It is a most valuable addition to the series, and is a most interesting read. It is a most valuable addition to the series, and is a most interesting read.

REVIEWS OF BOOKS

GENERAL

Mesopotamia, 1917-1920: A Clash of Loyalties. By Sir Arnold Wilson. (Oxford University Press). 25s. od.

In the review of Sir Arnold Wilson's previous volume ("Loyalties: Mesopotamia, 1914-1917")¹ the present writer stated that if the further volume promised by the author maintained the standard of that under notice, it would "complete one of the most important contributions to the military and political history of our time." The supreme difficulties of maintaining that standard, indicated very slightly by the title, "Loyalties," of the first volume and the sub-title, "A Clash of Loyalties," of the second, can only be realised by a careful reading of the book itself, wherein the author admits that his task has not been an easy one. The fact that he has signally succeeded will best be appreciated when the book is put down after perusal.

Having dealt in broad outline with the military operations in Mesopotamia under Sir W. R. Marshall, which ended with the armistice and the occupation of Mosul, the author briefly tells the story of General Dunsterville's mission to Russia, events in Persia, in the Caucasus and the Caspian Sea, all of which it was necessary to include for a true understanding of all that follows. Thereafter, the book is mainly concerned with the development of Iraq—a long and detailed recital of departmental activities of perhaps little historical importance intrinsically, but none the less interesting and certainly useful if only for the fact that no consecutive record of these events exists elsewhere. The introduction and growth of civil administration, and the difficulties against which each department had to contend; political situations and discussions; military and police measures for the inception and maintenance of law and order, and for the suppression of disturbances, carry the history along for the two years succeeding the armistice. The story is indeed that of a clash of loyalties, a tangled skein of many conflicting interests, represented by peoples and tribes of widely differing ambitions, hopes and fears.

Sir Arnold Wilson clearly states the problems and the means adopted for their solution, and the value of his work is greatly enhanced by the inclusion of a memorandum by Miss G. L. Bell on "Self-determination in Mesopotamia," by an excellent index, and, lastly, by the two maps selected from the Official History of the War in Mesopotamia.

NAVAL

Official History of the War. Naval Operations. Vol. V. Newbolt. (Longmans, Green & Co.). 31s. 6d.

This, the latest,—and, for the moment it would seem, the last—volume of the official history of the naval operations of the War, is in some respects the most interesting of the series. The earlier volumes dealt with clearing the seas of enemy cruisers, the tragedy of Coronel, the victory of the Falklands, the ill-timed and ill-fated effort against the Dardanelles, the battle of Jutland, with naval

¹ R.U.S.I. JOURNAL, February, 1931: p. 223.

co-operation in many and various theatres of land warfare, and with the growing menace of the German submarine campaign. This, the fifth volume, is mainly devoted to the crisis of that campaign. It opens at a period when the fate of England's sea communications was trembling in the balance, and she was within a few weeks of starvation and a defeat which would have brought the whole allied cause crashing to disastrous surrender. No more grave warning has ever been given to a Government than that written by Admiral Jellicoe, as First Sea Lord, in April, 1918. "The policy of the war must, of course, be decided by the Government. . . . I feel, however . . . that I ought to indicate several very important matters which, in my judgment, demand immediate attention," he wrote. These matters were: (a) the withdrawal of our whole force from Salonica; (b) convoys with troops to bring other essentials from the Colonies; (c) the policy of importing labour to be abandoned; (d) the import of everything which was not essential to the life of the country to be "ruthlessly and immediately" stopped. "When with this help supplies have been received and the country is in a position to withstand a siege, then we can reconsider the whole position. Without some such relief as I have indicated—and that given immediately—the Navy will fail in its responsibilities to the country, and the country itself will suffer starvation," concludes this impressive memorandum.

The bulk of this new volume of the History is devoted thenceforward to the record of how the enemy's submarine threat was overcome. Probably the most effective of the many different measures resorted to was the adoption of the convoy system; and here it is very doubtful whether credit is given where credit is really due. A history of this kind is necessarily compiled from official records, but these often fail to disclose the true originators of vitally important proposals. The light of a civilian Minister, however, is seldom hidden under a bushel and the advantages derived from the policy of obtaining supplies, whenever possible, from the United States and Canada with the resultant increased concentration of shipping on the North Atlantic route, is appropriately appreciated.

The History brings out clearly, though, that it was the combination of naval effort which, in the end, brought victory. In the North Sea and Channel, the Scandinavian Convoy, the Northern Barrage, the activities of the Harwich Force, the safeguarding of the Downs, the Dover Barrage, the operations on the Belgian Coast, and the "Q" Ships, all played their parts, and all worked under the protective wing of the battleships of the Grand Fleet, without which the whole anti-submarine campaign must have collapsed. In the approaches to the Channel—the "Fastnet-Land's End-Ushant triangle"; in the Mediterranean—the Straits of Gibraltar, the Otranto Barrage, and in its Eastern waters; even in Northern Russia, allied forces co-operated with the British Navy to obtain a stranglehold on the German octopus. One by one its tentacles weakened or were lopped off, until at length it relaxed its malicious grip, and the seas were free once more.

It is a dramatic story, this saving of the Empire from a danger the like of which has never threatened it before. It should serve as a warning never to relax vigilance, never to neglect the study of new weapons and their antidotes, never to be caught unprepared. But the whole of these five volumes teem with lessons for the naval student. They record weaknesses in high places—the lack of co-operation between the Services which existed during the War and the non-existence of machinery for dealing effectively with the whole problem of safeguarding and utilising the nation's shipping during hostilities, to quote but two examples. They show, too, how the "routine mind," with its inelasticity and dependence on the written order, may be the cause of serious failures—such as

omissions to report the movements of the enemy on the night after Jutland or during the German destroyer raid on the Dover patrol; and the fatal results of ostrich-like stupidity which withholds the *en clair* signal for fear of giving information to the enemy when it is far more important to transmit it instantly to friends. They emphasize, what is all too liable to be forgotten in peace time training, that the man who does nothing, because he has no orders to guide him will, when he meets some unforeseen contingency, miss the golden opportunity to serve his country in war; but that he who is not afraid to act without asking permission is the type of individual that the Navy should encourage and promote.

Most of the lessons of the greatest war at sea the world has ever seen, the student must, however, cull from these pages for himself, for, apart from the Admiralty disclaimer of all responsibility, which will ever be a matter for astonishment, this History lacks something. Primarily, it fails to bring out clearly cause and effect in cases of failure and success. Throughout, it is a plain and kindly narrative; too detailed for the general public, yet insufficiently professional and critical for the naval student. Except in the introduction, and here and there where some epic, like Zeebrugge, lends itself to the literary touch, there is little trace of the characteristics of the distinguished author whose name this volume bears, but the staff of the Historical Section to whom he pays a well-merited tribute, deserve the gratitude of posterity for their painstaking labours, and they must share with the publishers the thanks of the reader for the excellent way in which this large work has been produced.

Economy and Naval Security. By Admiral Sir Herbert Richmond. (Ernest Benn, Ltd.). 8s. 6d.

This is described as "a plea for the examination of the problem of the reduction in the cost of naval armaments on the lines of strategy and policy." The author develops a line of argument which he has employed in letters to the *Times* and elsewhere advocating the universal adoption of small warships. Such a policy, he maintains, would not jeopardise our sea security.

Whatever may be the weight of professional opinion in this country, his views on this subject do not appear to be in accord with those which govern the naval policy of any of the principal sea Powers abroad. This being so, it does not seem likely that there will be any general agreement to such drastic reduction of maximum displacement as he would wish.

"The strength of a navy is conditioned by two things, the one absolute, the other relative," says Admiral Richmond. This is an axiom which cannot be too strongly or too frequently impressed upon those responsible for our naval strength, while it should never be forgotten by those who set out to design new ships and new fleets. The author performs a useful service in restating and bringing up to date the duties which the British Navy is required to carry out and the "absolute" conditions which it should be able to fulfil. But the reader who may find himself being persuaded into a predilection for the small warship should bear in mind the "relative" conditions which must govern construction.

If we assume that international agreement to such limitation in displacement is possible, the "relative" value of the small ship in providing sea security is a subject which can provoke almost unlimited theorising and speculation, and those who like to indulge in these pastimes will find ample food for argument and counter-argument in this little volume.

MILITARY

Wellington: The Bidassoa and the Nivelle. By Major-General F. C. Beatson, C.B. (Edward Arnold & Co.). 15s. od.

The title of this book is at first sight a trifle puzzling; it should have been called "Wellington's passage of the Bidassoa and Nivelle," since it deals with that phase of Wellington's invasion of France exclusively. Within that compass the author gives us a perfectly plain straightforward account of those operations. He has evidently visited the ground and his description of the difficult movements that took place between the two rivals are adequately described. But he might have emphasized more strongly the difficulties facing Wellington, mainly the absence of any roads and the execrable nature of such tracks as existed. Good use has been made of contemporary literature, yet it seems a pity that a little more is not said about the privations that the troops endured during the autumn and winter of 1813-14. Sergeant Anton describes the men's clothing as follows: "Some had the elbows of their coats mended with grey cloth, others had the one half of the sleeve of a different colour from the body; and their trowsers were in equally bad a condition as their coats . . . Numbers of men had no shoes and so had to 'pad the hoof' . . . To remedy the want of shoes the raw hides of the newly slaughtered bullocks were given to cut up . . . to form a sort of buskin." Spaniards were drafted into certain British regiments up to ten to fifteen per company to make good casualties. Without more allusion to these difficulties and hardships the recital of the operations tends to lose colour. Indeed, it is amazing to find that an army in such a plight could march and fight as it did.

Nevertheless the encomium passed by Wellington on his troops, which is quoted in the last chapter, did not always seem to hold good. The faithful Larpet distinctly says at one juncture that it was the worst army in Europe; again that it had to be "hung and flogged" into some kind of discipline. The truth is that a very large proportion of the men were first-class soldiers, even though they never entirely got over their penchant for pillaging. The residuum which came under Larpet's cognizance as Judge Advocate General was bad. Anyhow they well deserved their victory at the Nivelle.

The book would be more useful if supplied with more and detailed maps and perhaps a bibliography.

The Battle of Dora. By H. E. Graham. (Clowes & Son, Ltd.). 5s. od.

A descriptive account of the use of a mechanized and armoured force in the future.

The author has had practical experience with the first Experimental Armoured Force on Salisbury Plain, and is evidently very enthusiastic about the possibilities open to an armoured force and a great believer in its bold tactical handling.

As the preface states, the dice are very much loaded in favour of the armoured forces, in fact, everything comes off for them as the enemy is badly equipped and can do nothing right. Whether the task of the armoured force and also the tactical handling of it, entailing great dispersion, were sound, is open to criticism. There are also several other debatable points. The value of concealment from hostile aircraft, especially when lying up, and the necessity of moving after dark are made clear.

The arguments for the inclusion of a mechanical field artillery brigade in the armoured force are well brought out.

The maps are good, and the author in the preface and the résumé explains very clearly his reasons for the tactical dispositions adopted. It is a book that should be read by all interested in mechanized warfare of the future.

The Indian Mutiny in Perspective. By Lieutenant-General Sir George MacMunn, K.C.B., D.S.O. (G. Bell & Sons, Ltd.). 15s. od.

The chief value of this ably written book lies in the fact that it can be studied from the point of view of the higher officials, both military and civil, and the salient features are not dwarfed by accounts of atrocities, heroism and reprisals. It gives, what but few other works do, the organization and system of command prevailing. It is worthy of note, that the system did not materially differ from that now in existence. We learn, in this connection, that many orders attributed to John Lawrence and others were really issued by the military authorities in close liaison—as they should be. On the other hand, the paralysis brought about by the outbreak occurring while the Commander-in-Chief was on tour some hundreds of miles from the Governor-General at Calcutta is equally well shown. The Military Member on the Council, unfortunately in this case, though under normal circumstances it would have been an advantage, was an officer ignorant of soldiery, and Canning had no adviser of ability at his elbow. With regard to the causes of the revolt, insufficient stress has been laid on the dangerous homogeneity of race and religion prevailing in the Bengal Army, as contrasted with those of Bombay and Madras, which remained staunch; and it is as well to recall that, since 1914, no fewer than three Indian corps of homogeneous racial composition have come to grief,—one of them a dangerous mutiny at Singapore,—whereas the like has never occurred in a "class company" corps. In this connection, in 1857, unless in very effective hands, the presence of European troops was no check on wholesale mutiny, though "class company" organization would have been.

The loose talk of pusillanimity on the part of the Commander-in-Chief on first learning of the outbreak, is shown to have been baseless. Anson did all that a man could do, and his orders were actually issued three days before those of John Lawrence, sound, and admirably suited to meet the situation. Delay was entirely due to the passion of India for doing things on the cheap. No organised transport existed at all, both it and supplies having to be impressed by the civil authorities—and civil rule became disorganised when bands of sepoys began to rove the country. Mobilization arrangements were Gilbertian; the Bengal Fusiliers marched down from the Simla Hills with only twenty rounds pouch ammunition per man, the balance being at Phillour, under a sepoy guard. Despite warnings by Sir Charles Napier, vital strategic points like Allahabad had sepoy garrisons only, with the result that still further delay occurred, and the disasters at Cawnpore and Lucknow were directly traceable to this factor. To the persistent criticism of delay in disarming Purbiah sepoy corps it is as well to remember that time and again the British officers held their men steady, though times more it failed. None the less, the former often did invaluable work.

The difficulties of mobilising the newly arrived troops from England are well brought out—flour, for instance, had to be brought from the colonies and there were no horses locally obtainable.

Finally, it is made clear that, with the exception of a few areas, where grievances, fancied or actual, had not queered the pitch, the people of all grades remained peaceful and quiet where not disturbed by the frenzied troops. The Mutiny was, in no sense, a national upheaval as is now the fashion in certain quarters to represent it.

Aus der Gedankenwerkstatt des Deutschen Generalstabes, von Wolfgang Foerster, Oberarchirat und Mitglied des Reichsarchivs. (Berlin: Mittler und Sohn). 13.50 marks.

Lieutenant-Colonel Foerster is well known as the author of "Graf Schlieffen und der Weltkrieg," in which he revealed much, but not all, of the "Schlieffen Plan." His new book contains four long chapters on different subjects: "Count Schlieffen and the Heirs of his Doctrine"; "The German War Plan," divided into "War in the West," "War in the East" and "War on Sea"; "The Uncertain Ally (Italy)" and "The War Plans of our Enemies" (France and Russia only). In general, it is a defence of the German General Staff and its doctrine, and, having full access to the German archives, the author introduces a certain amount of new matter.

In the first chapter he defends Schlieffen and Moltke from the attacks which have been made on them, in particular he denies that there was any difference of doctrine between them. He offers a clue to the reason which made Moltke send forward the left wing (Sixth and Seventh Armies) to the attack, after it had defeated the French offensive in Alsace-Lorraine, instead of using its corps to strengthen the enveloping wing. Every year the Schlieffen plan was tried out at war games and staff tours, the commander representing the French doing something different each time. At staff tours in 1906 and 1912 Moltke in his summing up unequivocally stated that "an offensive of the main French forces past the south of Metz into the *Reichsland* must bring to a halt the further march through Belgium and the wheel against the French left." On each occasion he blamed the German commander who had continued these operations undisturbed by the enemy offensive into the *Reichsland*. In explaining his views, he said that the whole reason for the march through Belgium was to get at the French in the open field and to avoid the loss of time and the casualties which would occur in forcing their fortress line. If therefore the French came out voluntarily into the open beyond the fortresses, there was no object in continuing the operations through Belgium: "there was only one determining factor, which was to attack and defeat the French Army wherever it might be." But, as we know, Moltke did not stop the offensive wing moving on Paris. It would seem that he failed because he tried to carry out the complete Schlieffen idea, which was a Cannae, with double development.

Colonel Foerster has to admit that the Schlieffen plan was designed for forces which the *Reich* did not possess when it was made, or when it was put into execution in 1914, and that it was drawn up at a time when Russia, after the Manchurian War, was not a formidable opponent. He urges, however, that Schlieffen meant to raise additional forces, in particular to have the organization and equipment ready for eight *Ersatz* corps to be formed at outbreak of war, and that no preparations for this were made by his successor.

He gives the whole story of the change from the elder Moltke's plans for attacking Russia first and standing on the defensive against France, and of the development of the plan actually carried out. It is denied that Moltke promised Conrad von Hötzendorf, as the latter has stated, that he would make a combined offensive with the Austrians, directed south-west and north-east towards Siedlce (east of Warsaw).

As regards war at sea, it is stated that the Admiral Staff agreed to attack the British fleet on declaration of war, and did not tell the General Staff that it had changed its plan.

The arrangements for assistance from Italy were made between the two General Staffs; there was no diplomatic agreement: "the history of the German-Italian Convention is thus a classic example of the fact that military agreements between

General Staffs alone are completely valueless, if they are not more or less in unison with the political aims of the States concerned."

The account of the French plans verges on the ridiculous: Colonel Foerster holds it established that the French meant to move through Luxembourg, if not Belgium, and, on the statements in the book of a certain Albert Heiden, that they also meant to violate Swiss neutrality. He does not seem to know where to look for the Russian plan of campaign, and has nothing concrete to say about it:—it is given in German in the Austrian Official History. He claims that a partial mobilization of the Russian forces against Austria was "on organizational and technical railway grounds, and also on strategic grounds, impossible, and therefore had not been prepared by the Russian Staff." And yet we know that it took place. The book therefore is a curiosity as showing the length to which a good German will go in order to explain the defeat of the Fatherland in the field. It makes one recall what Prince Bülow said Bethmann-Hollweg should have done about the "scrap of paper" incident.

La Tragedie des Dardanelles. By Edmond Delage. (Paris: Bernard Grasset). 1931.

M. Delage has already published certain translations in France of British war literature, including that of Mr. Churchill's "World Crisis." The present volume presents a short, well-informed, account of the Dardanelles campaign in the form of a straightforward readable, if popular, little work, in which the French participation in the fighting by sea and land is not overlooked. The total French casualties in the campaign are given at over 27,000. The author has a warm spot in his heart for Sir Ian Hamilton and a corresponding sense of pained astonishment and dislike for the authorities who planned the whole sequence of the operations.

AIR

The War in the Air. Vol. 3. By H. A. Jones. (Oxford University Press). With portfolio of 42 maps. 23s. 6d.

This, the third volume of "The War in the Air," compiled by the direction of the Historical Section of the Committee of Imperial Defence, deals with the destruction of the German cruiser, "Königsberg," the work of aircraft in the campaigns against German East Africa and German South West Africa, the air attacks on Great Britain between 1914 and 1916, the problems of supply, administration, recruitment and training between the same years, and the air developments and operations on the Western Front in the winter of 1916-17 and during the battle of Arras in 1917. A portfolio of maps accompanies the volume.

The facts are largely obtained from official records—a method that has its limitations as well as its advantages—but in addition, the author, Mr. H. A. Jones, undertook a good deal of independent research and in particular visited Berlin and obtained from the Germans important information for completing the airship raid reports compiled by our own General Staff during the war. The new volume ably carries on the work of its two predecessors and advances a stage further the great task originally undertaken by the late Sir Walter Raleigh. It is fully documented and, so far as can be seen, complete. In following the development of military aeronautics through these pages it is curious to note how ideas recur; how they are advanced, ignored or declined and then advanced again and accepted. For instance, an intercepting force of aeroplanes on the East side of Great Britain, much in accordance with present day air defence strategy with its screen of

interceptor fighters, was visualized by Mr. Winston Churchill, then First Lord, on the 5th September, 1914. In fact it seems that the fundamental principles of air defence were fully appreciated in the war and were consciously applied in the attempts to check air raiders. The British efforts to combat the German Zeppelin raids, although of less importance than the later efforts to combat the aeroplane raids, will always remain one of the most fascinating aspects of the war in the air. The raids are here examined in detail and the reports on both sides are collated and corrected one against the other with the actual position of the bombs dropped as the final arbiter between them. Some of the German airship commanders were far out in estimating their positions over England. A remarkable side light is thrown on the raids by the quotation of Squadron Commander J. C. Porte's order to his officers at Hendon instructing them, if they had run out of ammunition while engaging a Zeppelin, and if the Zeppelin was still heading for London, to ram the airship. A similar order had been issued by a Squadron Commander of the Royal Flying Corps.

In the last part of the book a good impression is given of the way in which the air forces of Germany and of Great Britain contended for the mastery at the points of their highest concentration; with now one, now the other in the ascendant, according to the quality and quantity of their aircraft. And it is not a little surprising to note that the view that strategical blunders were committed by the air staff on a large scale is supported by many of the facts given by Mr. Jones. Thus it appears that with approximate equality in performance of their aircraft, and with from two to three times the number of aircraft in a given sector, the British forces were yet making enormous sacrifices in material and personnel in order to maintain that "air supremacy" which consisted mainly in flying continuously over territory held by the Germans and was often nothing more than a doctrinaire supremacy. The question which occurs to the reader of Mr. Jones' book again and again is: Was this "ascendancy" worth the expenditure in lives and material? Were not the Germans employing their air forces more wisely than we were? Either our pilots were greatly inferior to the German, or else the policy of keeping British formations constantly over the German lines, a perpetual mark for anti-aircraft guns and for aeroplanes, and of sending out a constant stream of patrols regardless of the needs of the moment, was a schoolboy policy designed more to secure honour and glory than any genuine material advantage for the Allies. A statistical survey of the whole situation might help to clear up this point. In any event this volume supplies much matter for comment and discussion and Mr. Jones is fulfilling a difficult task with marked success.

The Aviation Year Book, 1931. By Charles E. Lee. (Sampson Low, Marston Co., Ltd.) 10s. 6d.

The writer of civil aviation history has a task but little less difficult than the writer of military aviation history on account of the rapidity of progress, and of the consequent new lights which are so frequently being thrown on old subjects. "The Aviation Year Book" collects the facts but it suffers from lack of an index. This same criticism has been made before; but it has not influenced Mr. Lee who apparently believes that people will read right through such things as lists of aeroplane registration markings. The information the book gives, so far as can be discovered by dipping into it haphazard, is accurate; but in the individual articles a certain amount of pruning of platitudes would make the book more acceptable to the aeronautically instructed reader. It is to be hoped that next year this work will incorporate an index.

REGIMENTAL HISTORIES

A History of the 17th Lancers (Duke of Cambridge's Own). Vol. II. 1895-1924. By Major Gilbert Micholls. (Macmillan & Co.). 30s.

The history of this cavalry regiment is well got up and written in an easy style without minute detail, while it is provided with a few clear maps and photographs. It deals mainly with the work of the Regiment in South Africa and during the Great War. One-third of its bulk consists of Appendices. It is a pity that it should contain misprints and other like inaccuracies.

The History of the South Wales Borderers, 1914-1918. By C. T. Atkinson, late Captain, O.U.O.T.C. (The Medici Society, Ltd.). 7s. 6d.

Although never represented in Italy or Palestine the South Wales Borderers fought in almost every major battle of the Great War outside these two theatres of operations. On the other hand, they had the distinction of being the only British troops at the siege of Tsingtao. In 500 pages the author gives a scholarly and lucid account of the activities of the dozen battalions of the Regiment that existed or came into being during the war. The skeleton maps illustrating the narrative are good; so is the indexing. There are no illustrations which, in view of the modest price is not surprising.

The Gloucestershire Regiment in the War, 1914-1918. By Everard Wyrall. (Methuen & Co.). 7s. 6d.

Twenty-four battalions of the Gloucester Regiment were in existence during the war. Nineteen of them served overseas, the majority in France, the 1st Battalion being part of the original B.E.F.; four proceeded to Italy; two served in Macedonia, one of these, the 2nd, throughout that campaign; one battalion fought at Gallipoli and in Mesopotamia. Out of their records the author has compiled a compact and attractive narrative, illustrated with excellent maps and unusually free from appendices save one serviceable list giving in tabular form the activities of the various battalions. The price is commendably low.

Records of the 1st Somerset Militia (3rd Bn. Somerset L.I.). By Major W. J. W. Kerr. (Gale & Polden, Ltd.). 25s.

The Somerset Militia has an interesting history which is traced in this volume from the earliest times down to the Act of 1908, by which the Militia battalions were converted into the Special Reserve. The first actual Regiment of Somerset Militia was raised in 1559. It was embodied in 1759 as the 1st Battalion, a 2nd Battalion being formed at the same time. The story of the Regiment is described briefly but very carefully, reference being made to each year's training.

The Fifth Battalion The Durham Light Infantry, 1914-1918. By Major A. L. Raimes, D.S.O., T.D. (Published privately).

The Battalion formed part of the 50th Northumbrian Division of the Territorial Force. It was embodied on the outbreak of war in 1914 and reached France, with the Division, on 18th April, 1915. A few days later it became heavily involved in the Second Battle of Ypres. From that day onwards it fought in several of the

major battles of the war, the Somme in 1916, Arras and the third Battle of Ypres in 1917. In 1918 it was involved in the retreat of the Fifth Army. There is one chapter devoted to the work of the 2/5th D.L.I. in 1917-18 at Salonika. The book is well and profusely illustrated.

Historical Records of the 3rd Sikhs, 1847-1930. Anonymous. (Privately published).

This volume is not a regimental history in the ordinary sense of that expression but a collection of documents and records which is divided into three parts. One part consists of papers referring to the 3rd Sikhs Infantry, Punjab Frontier Force, from the raising of the regiment to 1902. The second covers the period 1903-1922 when the Regiment was known as the 53rd Sikhs (Frontier Force). This part describes the activities of the Regiment during the Great War on the Suez Canal, at Aden, in Mesopotamia and Palestine from 1915 to 1918. The third part covers the period from 1923, when the regimental title was altered to 3rd Battalion 12th Frontier Force Regiment (Sikhs), down to the present time.

ADDITIONS TO THE LIBRARY

GENERAL

- BRITIS.** By Major P. Hodges. 12s. 6d. 8vo. (Jonathan Cape).
- NATIONAL CHARACTER.** By E. Barker. 10s. 6d. 8vo. (Methuen & Co.).
- MODERN POLITICAL CONSTITUTIONS.** By C. F. Strong. 12s. 6d. 8vo. (Sidgwick & Jackson).
- THE EIGHTEENTH DECISIVE BATTLE OF THE WORLD.** WARSAW, 1920. By Viscount d'Abernon. 10s. 6d. 8vo. (Hodder & Stoughton).
- THE FOREIGN POLICY OF CASTLEREAGH, 1812-1815.** By C. V. Webster. 25s. 8vo. (G. Bell & Sons, Ltd.).
- AUS DER GEDANKENWERKSTATT DES DEUTSCHEN GENERALSTABES.** By W. Foerster. R.M.6.50. 8vo. (E. S. Mittler & Sohn, Berlin). Presented by the Publishers.
- TRAVELS OF JOHN SANDERSON IN THE LEVANT, 1584-1602.** Edited by Sir William Foster. 8vo. (Hakluyt Society).
- THE SOVIET FIVE-YEAR PLAN AND ITS EFFECT ON WORLD TRADE.** By H. R. Knickerbocker. 8s. 6d. 8vo. (John Lane).
- THE COMING OF THE WAR, 1914.** 2 Vols. By B. E. Schmitt. 8vo. (Charles Scribner's).
- SMARANDA.** By the late Lord Thomson of Cardington. 7s. 6d. 8vo. (Jonathan Cape).
- INDIA ON THE BRINK.** By a British-India Merchant. 3s. 8vo. (P. S. King).
- THE SURRENDER OF AN EMPIRE.** By Nesta H. Webster. 15s. 8vo. (Boswell Printing & Publishing Co.).
- THE SIZE OF THE ARMY OF XERXES IN THE INVASION OF GREECE, 480 B.C.** By Major-General Sir F. Maurice. Pamphlet reprinted from the Journal of Hellenic Studies. Vol. L. Presented by the Author.
- MEMOIRS OF PRINCE VON BULOW, 1897-1903.** Translated by F. A. Voigt. 25s. 8vo. (Putnam).
- THE LIFE OF FIELD-MARSHAL SIR JOHN FRENCH.** By Major The Hon. Gerald French. 15s. 8vo. (Cassell & Co.). Presented by Lieutenant-Colonel H. G. de Watteville.
- A GLANCE AT GALLIPOLI.** By Lieutenant-Colonel C. O. Head. 7s. 6d. 8vo. (Eyre & Spottiswoode).
- MESOPOTAMIA, 1917-1920: A CLASH OF LOYALTIES.** By Lieutenant-Colonel Sir A. T. Wilson. 25s. 8vo. (Oxford University Press). Presented by the Publishers.
- THE INDIAN MUTINY IN PERSPECTIVE.** By Lieutenant-General Sir George MacMunn. 15s. 8vo. (G. Bell & Sons, Ltd.). Presented by the Publishers.

SHIKAR NOTES FOR NOVICES. By The Hon. J. W. Best. 10s. 8vo. (Pioneer Press, Allahabad). Presented by the Publishers.

MARSHAL LYAUTEY. By Andre Maurois. Translated by Hamish Miles. 12s. 6d. 8vo. (The Bodley Head).

NAVAL

ECONOMY AND NAVAL SECURITY. By Admiral Sir Herbert Richmond. 8s. 6d. 8vo. (Ernest Benn, Ltd.). Presented by the Publishers.

NAVAL OPERATIONS. Vol. V. 1917 TO THE ARMISTICE. By Sir Henry Newbolt. 31s. 6d. 8vo. (Longmans).

THE WAYS OF THE NAVY. By Rear-Admiral D. Arnold Foster. 7s. 6d. 8vo. (Ward, Lock & Co.). Presented by the Publishers.

MILITARY

WELLINGTON: THE BIDASSOA AND NIVELLE. By Major-General F. C. Beatson. 15s. 8vo. (Edward Arnold & Co.). Presented by the Publishers.

THE BATTLE OF DORA. By H. E. Graham. 5s. 8vo. (William Clowes & Sons). Presented by the Publishers.

TRADITION ET PROGRES. CAVALERIE D'HIER—CAVALERIE D'AUJOURD'HUI—CAVALERIE DE DEMAIN. By Commandant D'Amouville. 8vo. (Berger-Levrault, Paris). Presented by the Publishers.

KARTENBILD DES HERBSTFELDZUGES 1914 IM OSTEN. By Von Mantey. 8vo. (E. S. Mittler & Sohn, Berlin). Presented by the Publishers.

L'ANNEE, 1920. By J. Pilsudski. Translated from the Polish by Lieutenant-Colonel B. Jeze and Comdt. J. A. Teslar. Frs. 30. 8vo. (La Renaissance du Livre, Paris).

LA STRATEGIE BRITANNIQUE. By Major-General Sir F. Maurice. Translated by P. Reymond. Frs. 25. 8vo. (Payot, Paris). Presented by Major-General Sir F. Maurice.

DIE ORGANISATION DES HEERES. By Paul Schneider. R.M. 850. 8vo. (E. S. Mittler & Sohn, Berlin).

MODERNE KAVALLERIE. By G. Brandt. R.M. 550. 8vo. (E. S. Mittler & Sohn, Berlin).

MY EXPERIENCES IN THE WORLD WAR. By J. J. Pershing. 31s. 8vo. (Hodder & Stoughton).

L'ENIGME DE CHARLEROI. By G. Hanotau. Frs. 150. 8vo. (L'Editions Francaise Illustree, Paris, 1917). Presented by H. Atteridge.

LA VERITE DUR LE SIEGE DE MAUBEUGE. By Commandant P. Cassou. Frs. 3. 8vo. (Berger-Levrault, Paris, 1919). Presented by H. Atteridge.

SIDELIGHTS ON THE THIRTY YEARS WAR. 3 Vols. By H. G. R. Reade. 45s. 8vo. (Kegan Paul, French, Trubner & Co.). Presented by Major-General R. Reade, C.B., C.M.G.

THE FORTS OF CHIGNECTO. By Dr. J. Clarence Webster. 8vo. Published and presented by the Author.

REGIMENTAL HISTORIES

- A SHORT HISTORY OF THE PRINCE OF WALES'S VOLUNTEERS. Compiled by Lieutenant-Colonel F. E. Whitton. 8vo. (Gale & Polden, Aldershot). Presented by Colonel H. C. Wylly.
- HISTORICAL RECORDS OF THE 3RD SIKHS, 1847-1930. Anonymous, 8vo. (Privately Published). Presented by the Commandant and Officers, 3rd Battalion, 12th Frontier Force Regiment (Sikhs).
- A HISTORY OF THE 17TH LANCERS. Vol. II. 1895-1924. By Major G. Micholls. 3os. 8vo. (Macmillan & Co.). Presented by the Publishers.
- THE HISTORY OF THE SOUTH WALES BORDERERS, 1914-1918. By C. T. Atkinson. 8vo. (The Medici Society). Presented by the Publishers.
- THE 5TH BATTALION, THE DURHAM LIGHT INFANTRY, 1914-1918. By Major A. L. Raimes. 15s. 6d. 8vo. Presented by the Officers of the Regiment.
- THE GLOUCESTERSHIRE REGIMENT IN THE WAR, 1914-1918. By E. Wyrall. 7s. 6d. 8vo. (Methuen & Co.). Presented by the Publishers.
- THE 16TH FOOT. A HISTORY OF THE BEDFORDSHIRE AND HERTFORDSHIRE REGIMENT. By Major-General Sir F. Maurice. 5s. 8vo. (Constable & Co.). Presented by the Publishers.

AIR

- THE WAR IN THE AIR. Vol. III. By H. A. Jones. 23s. 6d. 8vo. (Oxford University Press). Presented by the Publishers.
- THE BOOK OF THE "C19" AUTOGIRO. By C. J. Sanders and A. H. Rawson. 5s. 8vo. (Sir Isaac Pitman & Sons). Presented by Colonel J. Josselyn, C.M.G., D.S.O., O.B.E., T.D.
- THE WORLD IN THE AIR. 2 Vols. By F. T. Miller. 63s. 8vo. (G. Putnam's Sons).
- THE HISTORY OF AERONAUTICS IN GREAT BRITAIN. By J. E. Hodgson. 84s. 8vo. (Oxford University Press).
- THE AVIATION YEAR BOOK. 1931. Edited by Charles E. Lee. 10s. 6d. 8vo. (Sampson, Low, Marston & Co.). Presented by the Publishers.

THE SOCIETY FOR NAUTICAL RESEARCH

(FOUNDED IN 1910).

Patron:

H.R.H. PRINCE GEORGE, K.G., G.C.V.O

President:

**Admiral of the Fleet EARL BEATTY, P.C., G.C.B., O.M.,
G.C.V.O., D.S.O., D.C.L.(Oxon.), LL.D.**

THE OBJECTS OF THE SOCIETY:

(1) To encourage the study of nautical and naval antiquities; including the dress and equipment of seamen in all ages and races, and the build of ships, both men-of-war and merchantmen.

(2) To compile a reliable Sea Dictionary or Sailor's Word-Book, and, with that end in view, to collect information which will explain obscure words and phrases, together with the customs, usages and folk-lore that gave rise to them.

(3) To pave the way to the establishment of a National Maritime Museum, such as those which already exist in countries less renowned than Britain for connection with the sea.

The Society has raised £100,000 to save Nelson's Flagship and has undertaken to restore H.M.S. *Victory* to the exact appearance which she wore at Trafalgar.

The Society issues once a quarter an illustrated journal of one hundred pages devoted to the study of nautical archaeology in all its branches.

The subscription of *One Guinea* entitles all who join the Society to one copy of all its Reports and quarterly journals.

For particulars of membership apply to the Honorary Secretary,

**PROFESSOR GEOFFREY CALLENDER, F.S.A.,
R.N. College, Greenwich.**

Cars for special occasions

SLOANE 3456

Superb 6-seater Daimlers
with liveried chauffeurs
always available.

**Daimler
Hire Ltd**

SLOANE 3456

243, KNIGHTSBRIDGE,
LONDON, S W 7.

CATCH YOUR TROUT
and/or
SHOOT YOUR SNIPE
in
SHETLAND

Furnished House to Let

Or you can have a billet with subsistence at any time of year in the house of a retired officer (bachelor), where trout fishing and snipe shooting can be got at moderate rates in season.

Apply—Proprietor
GARDIE HOUSE, BRESSAY, SHETLAND

RUSSIAN SCHOOLMASTER

Coaches for Russian Army
Interpretership Exams.,
T. ROMANOFF,

20 Mornington Av., W. Kens., W.14



REMEMBER
Two Steeples No.83

quality when you want a
good pair of socks.

FROM ALL HOSIERS

UNIVERSITY OF LIVERPOOL
FACULTY OF ENGINEERING

Dean—PROFESSOR G. E. SCHOLES, M.B.E.,
M.Sc., M.I.A.E., M.I.Mech.E.

Prospectus and full particulars may be obtained on application to the REGISTRAR of courses designed for Students desiring to qualify as Mechanical, Electrical, Civil or Marine Engineers, as Naval Architects or as Metallurgists and Metallurgical Engineers.

Land's End—
Sennen Cove
Hotel

Telephone: Sennen 5

A quiet and thoroughly comfortable Private Hotel. Magnificent sea view, beautiful sand, safe bathing, large lounge (70 ft.), also dining room (70 ft.), splendid fishing, lovely walks, perfect table supply, excellent cuisine, farm produce.

From 3 Guineas, Special Winter Terms.

Under entirely new management.

R.A.C.
Lock-up Garages

Mrs. A. C. BLAMPED, Resident Proprietress
(Late of St. Helier Hotel, Jersey)

BOOKS

Hugh Rees Ltd.

MILITARY AND NAVAL
BOOKSELLERS, STATION-
ERS AND PUBLISHERS.

5 & 7, REGENT STREET, S.W.1

New Publication.

Notes on Appreciations, Instructions,
Operation Orders, and Message Writing,
by Major O. G. Body, with 2 Ordnance
Maps. Price 8/6, Postage 6d.

MEMORIALS

in
Cast Bronze · Repousse-
Metal · Carved & Engraved
Brass · Marble · Stone & Wood

J. WIPPELL & CO. LTD

EXETER · High St. & Cathedral Yard
LONDON · 11, Telford St. & Westminster S.W.1
MANCHESTER · 32 Victoria Street

MY SKETCHBOOK
IN THE SHINY

BY
"SNAFFLES"

PRICE 21/- NET.

Postage & Packing: United Kingdom, 1/-; Abroad (regd.) 1/7.

GALE & POLDEN, LTD., 2, AMEN CORNER, LONDON, E.C.4

"The Sketches, drawn by one who has shared our sport, who has seen as we see and has so wonderful a talent for recording his impressions, will now provide us with a lasting reminder of that horse-lovers paradise wherein we have spent many of the happiest days of our lives."

Size 12½ × 9½, 104 pages with 30 plates, numerous vignettes and thumbnail sketches. Bound art canvas, heavy boards.

**ROYAL SCHOOL
FOR DAUGHTERS OF OFFICERS
OF THE ARMY
LANDSDOWN, BATH**

INSTITUTED A.D. 1864.

PATRONS:
HIS MAJESTY THE KING.
HER MAJESTY THE QUEEN.

President:
FIELD-MARSHAL H.R.H. THE DUKE OF
CONNAUGHT, K.G., &c.

Trustees:
SIR J. A. MULLINS, Kt.
COL. A. G. CHURCHILL, C.B., C.B.E.
BRIG.-GEN. SIR E. C. A. B. BEWICK COPELY,
K.B.E., C.B.

Chairman:
COL. A. G. CHURCHILL, C.B., C.B.E.

Vice-Chairman:
MAJOR E. K. RIDLEY.

EXTRACTS FROM RULES, ETC.

The Daughters of Officers who are serving, or who have served, in His Majesty's Army, or in the Royal Marines, are eligible for admission, at rates of £20 and £90 to £150 per annum; paying according to the circumstances of the parents. Those paying £20 per annum (one-third of the School) are admitted by the Votes of Subscribers only—the remainder by the Committee. The age for admission is from 10 to 15 years.

Each contributor of £5 5s. is entitled to one life vote, and each annual subscriber to one vote at two elections for each 10s. 6d. subscribed.

Further information can be obtained of the Secretary, MISS N. M. BAYLY, at the Office, Pantons House, 25, Haymarket, S.W.1.

LEGACIES
bestowed on the
Salvation Army

constitute investments in the name of humanity yielding a high annual return in service to men and women of all grades

£500,000 a year is required for maintenance of over 16,223 centres of work

FUNDS

may be earmarked for any Branch, such as General Evangelical Work, Child Welfare Work, Homes for Boys and Girls in difficult circumstances, Medical and Educational Work in Eastern Countries, Rescue Work, Missionary Work, Work amongst Lepers.

**HELP BY LEGACY
IS EARNESTLY SOLICITED**

Legacy Forms, etc., on application.
Contributions or enquiries to
101, Queen Victoria Street, E.C.4

NOW READY.



**THE
CAVALRY
JOURNAL**

Published under the authority of the Army Council, under the direction of Field-Marshal the Viscount ALLENBY, G.C.B., etc. (Colonel Life Guards and 16th/5th Lancers), assisted by Lieut.-General Lord BADEN-POWELL, G.C.B., G.C.V.O., etc. (Colonel 13th/11th Hussars), Lieut.-General Sir P. W. CHETWODE, Bt. K.C.B., K.C.M.G., D.S.O., Colonel A. E. W. HARMAN, C.B., D.S.O., A.D.C., Lieut.-Colonel Sir A. LEETHAM, Knt. K.C.V.O., etc., and Major-General T. T. PITMAN, C.B., C.M.G. (Managing Editor).

PUBLISHED QUARTERLY.

Price 5s. net.

No. 81. JULY 1931

CONTENTS.

The Battle of Barnet, 1471. (*Frontis piece*)
Cavalry at "Barnet Field."

"Lake and Victory": Agra. Part III.

"Quiet with Hounds."

A Shooting Trip to Ladakh in 1913.

Napoleonic Cavalry and its Leaders.
Part V.

Australia's Greatest Inland Explorer.

Philopemen: The Last of the Greek
Generals. Part II.

Disappearing Donkeys.

The Cavalryman of Romance: Brigadier Gerard in Real Life. Part V.

Some Thoughts on Training for Show
Jumping.

The French Foreign Legion.

Elitzem, 1705: A Missing Cavalry
Battle-Honour.

Notes.

Regimental Items of Interest.

Home and Dominion Magazines.

Foreign Magazines.

Recent Publications.

Sporting News, India.

All SUBSCRIPTIONS should be sent to, and all copies obtained direct from,

The Royal United Service Institution,
Whitehall, London, S.W.1.

BERLITZ

The teaching of Modern Languages in the Berlitz Schools is superior to any other :

- 1.—**BECAUSE** the conception of the Method is progressive and logical.
- 2.—**BECAUSE** each teacher teaches only his mother-tongue and before being allowed to teach, is obliged to complete a special instructional course in the Berlitz Method.
- 3.—**BECAUSE** the teaching which is oral and is given in the form of conversation inculcates the grammatical rules instinctively as it were and without any effort on the part of the pupil, instead of imposing upon him a course of dry and discouraging study.
- 4.—**BECAUSE** the pupils having a frequent change of teacher, do not get accustomed to any one way of speaking, neither do they hear only the same pronunciation, but are enabled to understand everybody. This is absolutely necessary to avoid difficulties when travelling in foreign countries.

PRIVATE LESSONS AND SMALL CLASSES
NEW COURSES BEGINNING EVERY MONTH

WRITE FOR BOOKLET "D 22" OR CALL

ENROL IMMEDIATELY

LONDON : 351 OXFORD STREET, W.1 (Head Office)
15 Harrington Road (S. Kensington)

8 Bucklersbury, Queen Victoria St. (City)
2 Queen's Road (Hayswater)

BIRMINGHAM : 32 Paradise Street.
MANCHESTER : 126 Portland Street.

LIVERPOOL : May Buildings,
51 North John Street.

SHEFFIELD : 44 Fargate.
BRADFORD : Central Chambers, Market Street.
EDINBURGH : 76 Princes Street.
GLASGOW : 206 Sauchiehall Street.

LANGUAGES

THE BERLITZ SCHOOLS OF LANGUAGES, LTD.

Registered for Transmission to Canada by Canadian Magazine Post

